A-E CERCLA/RCRA/UST STUDIES AND REMEDIAL DESIGN

Contract Number N68711-03-D-5104

Engineering Evaluation/Cost Analysis Non-Time Critical Removal Action for Taylor Boulevard Bridge Disposal Site (Site 30)

Naval Weapons Station Seal Beach
Detachment Concord
Concord, California

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FINAL

March 25, 2005

NAVFAC Naval Facilities Engineering Command

Department of the Navy
Integrated Product Team, West
Daly City, California

A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc.

SulTech

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Prepared for

DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command
Southwest Division
San Diego, California

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TABLES

ACRONYMS AND ABBREVIATIONS

µg/dL	Micrograms per deciliter
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
§	Section
AOC	Area of contamination
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
BAF	Bioaccumulation factor
BERA	Baseline ecological risk assessment
bgs	Below ground surface
BNSF	Burlington Northern Santa Fe Railroad Company
CA/HSC	California Health and Safety Code
Cal/EPA	California Environmental Protection Agency
CCR	*California Code of Regulations*
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COC	Chemical of concern
COEC	Chemical of ecological concern
COPC	Chemical of potential concern
CSM	Conceptual site model
DTSC	California Department of Toxic Substances Control
EE/CA	Engineering evaluation and cost analysis
EPA	U.S. Environmental Protection Agency
ERA	Ecological risk assessment
ER-M	Effects range-median
EO	Executive order
HHRA	Human health risk assessment
HI	Hazard index
HQ	Hazard quotient
INRMP	Integrated Natural Resources Management Plan
LDR	Land disposal restriction
LGP	Low ground pressure
LUC	Land use control

mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
msl	Mean sea level
NAWQC	National Ambient Water Quality Criteria
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	Non-time Critical Removal Action
NWS SBD	Naval Weapons Station Seal Beach Detachment
O&M	Operations and maintenance
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear aromatic hydrocarbon
PAS	Pacific Aerial Surveys
PCB	Polychlorinated biphenyl
PG&E	Pacific Gas & Electric Company
ppm	Parts per million
PRG	Preliminary remediation goal
QA	Quality assurance
QC	Quality control
RACER	Remedial Action Cost Engineering and Requirements
RAO	Removal action objective
RAP	Removal Action Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
ROD	Record of decision
SAR	Sodium adsorption ratio
SMHM	Salt marsh harvest mouse
S/S	Solidification and stabilization
STAECRU	SulTech Indefinite Quantity Contract for Architectural-Engineering Services to Provide CERCLA/RCRA/UST Studies
SulTech	A joint venture of Sullivan Consulting Group and Tetra Tech EM Inc.
SVOC	Semivolatile organic compound
SWRCB	State Water Resources Control Board
TA	Tidal area
TBB	Taylor Boulevard Bridge
TBC	To be considered
TCLP	Toxicity characteristic leaching procedure

TCRA	Time-critical removal action
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
TRPH	Total recoverable petroleum hydrocarbons
TRV	Toxicity reference values
UCL_{95}	95^{th} percent upper confidence limit
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UST	Underground storage tank
VOC	Volatile organic compound
Water Board	California Regional Water Quality Control Board
WET	Waste extraction test
yd^3	Cubic yards

EXECUTIVE SUMMARY

This final report summarizes the engineering evaluation and cost analysis (EE/CA) process, characterizes the site, identifies removal action objectives, describes and analyzes removal action alternatives, and provides a comparative analysis of the alternatives for the non-time-critical removal action (NTCRA) at Site 30, the Taylor Boulevard Bridge (TBB) Disposal Site at Naval Weapons Station Seal Beach Detachment Concord (NWS SBD Concord) in Concord, California. This report also addresses agency and community comments made on the draft version of the report (Appendix C). This report was prepared in accordance with current U.S. Environmental Protection Agency (EPA) and Department of the Navy guidance for non-time-critical removal actions.

SITE BACKGROUND

Site 30 is located below and west of the TBB, on land adjacent to Seal Creek Marsh. Site 30 consists of an abandoned disposal site. Visible waste at the site, consisting of broken glass, burned metal, and partially burned wooden railroad ties, litters the ground surface at much of the site. Pickleweed borders most of the shoreline of the site.

Previous investigations at the TBB disposal site include five soil and sediment sampling events, focused sampling for the ecological risk assessment (ERA), and groundwater sampling conducted as part of the remedial investigation (RI) for the site. A screening-level human health risk assessment (HHRA) and screening-level ERA were conducted, as well as a baseline ecological risk assessment (BERA), as part of the RI process for the site.

The primary chemicals of concern (COC) at the site are the metals arsenic, cadmium, copper, chromium, iron, lead, mercury, selenium, and zinc. The current level of metals at the site poses probable risk to plant, invertebrate, and bird and mammal receptors. Because a marsh and pickleweed are present at the site, the salt marsh harvest mouse, a federally listed endangered species, is presumed present at the site and is therefore presumed to be at risk as well. Areas with the highest levels of contamination by metals are located where the debris is most concentrated, which is along the shoreline and in the center of the site. A "risk footprint" that shows the overlap of risk to each receptor by location was developed to identify the areas of highest risk to help establish the boundary for a removal action.

REMOVAL ACTION OBJECTIVES

The presence of elevated levels of chemicals (metals) in soil and debris at Site 30 presents a potential risk to humans and ecological receptors that are exposed to the site. Because the site is infrequently used by humans, exposure to humans is low; therefore, the threat to human health at Site 30 does not warrant an emergency or time-critical removal action (TCRA). However, the ecological risk posed by the site warrants the proposed NTCRA.

The proposed NTCRA will be undertaken under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 of the Code of Federal Regulations, Part 300), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

These regulations and the statute define removal actions as the cleanup or removal of released hazardous substances, actions to monitor the threat of release of hazardous substances, and actions to mitigate or prevent damage to public health or welfare or the environment.

Based on CERCLA and the NCP, the removal action objectives (RAOs) for the site are as follows:

- Promote overall protection of human health and the environment.
- Restrict the potential for humans and other ecological receptors to contact chemical- or solid-waste-contaminated soil near the ground surface within Site 30.

The following criteria are considered action levels for excavation of soil and debris within the known solid waste disposal area at Site 30:

- Visual observations will be used to verify that soil containing solid-waste-contaminated soil is fully removed both vertically and laterally.
- Data presented in the RI (Tetra Tech 2002) indicated elevated concentrations of metals posing a risk to human and ecological receptors were collocated with elevated levels of lead. Therefore, the maximum concentration of lead outside of the risk footprint (268 mg/kg), for which risk was not indicated to either ecological or human receptors, will be used as the action level to confirm the removal of contaminated soil.

REMOVAL ACTION ALTERNATIVES

Four removal action alternatives for addressing the contaminated soils, sediments, and debris were identified and developed under this EE/CA:

- Alternative 1: No action
- Alternative 2: Monitoring
- Alternative 3: Excavation, stabilization, on-site disposal, LUCs, and habitat restoration
- Alternative 4: Excavation, off-site disposal, and habitat restoration.

COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

A comparative analysis was conducted to evaluate the relative performance of each alternative. Each alternative was evaluated considering the NCP criteria of overall protectiveness of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness; reduction of mobility, toxicity, or volume through treatment; short-term effectiveness; implementability; and cost.

Alternative 1, "No Action with Monitoring," does not include a removal action, but evaluation of Alternative 1 is required under CERCLA. Alternatives 1 and 2 do not provide adequate protection for human health or reduce ecological risks. Alternatives 1 and 2, therefore, do not meet the RAOs and are not expected to receive community or regulatory agency acceptance. Alternatives 3 and 4 are both effective in the long term and provide the maximum protection of human health and the environment. There is no cost for Alternative 1. The total cost for Alternative 2 is estimated at $382,000. The costs are estimated at $2.1 million for Alternative 3 and at $1.9 million for Alternative 4.

The individual and comparative analyses indicates that both Alternative 3 and 4 will provide acceptable levels of protection of human health and the environment and of long-term effectiveness and will comply with applicable or relevant and appropriate requirements (ARARs).

RECOMMENDED ALTERNATIVE

Based on the comparative analysis and relative ranking of the removal action alternatives, the Navy recommends Alternative 4, "Excavation, off-site disposal, and habitat restoration." Alternative 4 best meets the NCP criteria of overall protection of human health and the environment; compliance with ARARs; long-term effectiveness; implementability and cost.

1.0 INTRODUCTION

This engineering evaluation and cost analysis (EE/CA) addresses proposed removal action alternatives for the Taylor Boulevard Bridge (TBB) Disposal Site (Site 30) at the Naval Weapons Station Seal Beach Detachment Concord (NWS SBD Concord) in Concord, California. Site 30 is located in a marsh adjacent to an upland transition area. There are no paved areas, no buildings, and no constructed improvements at the TBB Disposal Site. The nearest improvements are the TBB and the Taylor Boulevard Railroad Bridge, which span the area adjacent to the eastern side of the site.

1.1 DESCRIPTION OF THE NON-TIME-CRITICAL REMOVAL ACTION AUTHORITY AND THE PURPOSE OF THE ENGINEERING EVALUATION/COST ANALYSIS

The purpose of a non-time-critical removal action (NTCRA) is to take action that reduces a threat to human health or the environment. This EE/CA develops, compares, and evaluates removal action alternatives for a planned NTCRA. The removal action planned is intended to serve as the final remedy for Site 30. The Navy's decision to undertake this NTCRA will be documented in an action memorandum in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the NCP (Title 40 of the Code of Federal Regulations [CFR] Part 300.5) define removal actions to include the following:

> "The cleanup or removal of released hazardous substances from the environment, such actions as may necessarily be taken in the event of the threat of release of hazardous substance into the environment, such action as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removal material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release."

This EE/CA evaluates proposed removal action alternatives that are intended to reduce the likelihood of exposure of human or ecological receptors to contaminated soil and sediment from the TBB Disposal Site at NWS SBD Concord.

Based on the NCP (40 CFR 300.415) the U.S. Environmental Protection Agency (EPA) has classified removal actions into three types, based on the circumstances surrounding the release or threat of release:

- An emergency removal action, where on-site cleanup is initiated within hours after a release or threat of a release has been verified.

- A time-critical removal action (TCRA) where, based on the site evaluation, a period of 6 months or less is available before on-site removal activities must be initiated.
- A NTCRA, where the on-site action will be taken more than 6 months after the planning period begins.

The potential threat of exposure to human health and the environment at the TBB Disposal Site does not warrant an emergency or TCRA because the risk is relatively low.

This EE/CA for a NTCRA at Site 30 addresses the implementability, effectiveness, and costs of the removal action alternatives, along with applicable or relevant and appropriate regulatory requirements. The Navy is the lead agency for removal actions at Site 30. As the lead agency, the Navy has the authority to select the alternative, considering public and regulatory comments. The Navy is working in consultation with the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), EPA, the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and the Cal/EPA San Francisco Bay Regional Water Quality Control Board (Water Board) to plan and implement this removal action.

1.2 SCOPE OF THE ENGINEERING EVALUATION/COST ANALYSIS

Site 30 (Figures 1 and 2) was identified in late 1995 during a remedial investigation (RI) conducted at four nearby Tidal Area sites. Sediment samples from borings in Site 30 and the surrounding area were collected in February 1996, March 1997, October 1997, February 1998, and June 1998 to assess the nature and extent of chemical contamination at Site 30. These evaluations indicated that concentrations of inorganic chemicals (primarily lead) at the center of Site 30 were higher than were detected in surrounding areas and posed a potential risk to both human health and the environment. Based on the conclusions of the RI (Tetra Tech 2002, 2004), the Navy proposed a removal action to mitigate the risk to the environment.

A screening-level human health risk assessment (HHRA) and a screening-level ERA (ERA) were conducted in August 1999 (Tetra Tech 1999a). The studies concluded that, although the site posed potential risks to human health, threats to ecological receptors were the primary risk drivers at the site because of the presence of wetlands, the potential presence of special status species, and the limited human access to the site. The site remediation necessary to mitigate the risk to animal receptors would also be expected to mitigate the risk to humans, even under extremely conservative assumptions about human contact with the site.

A baseline ERA (BERA) was conducted as part of the Site 30 RI from February through March 2000 to assess the threat to potential ecological receptors posed by the presence of wetlands and special status species (Tetra Tech 2002). The BERA evaluated these four ecological receptors: wetland and upland transitional plants, benthic invertebrates, aquatic birds (represented by the black-necked stilt [*Himantopus mexicanus*] and the mallard duck [*Anas platyrhynchos*]), and small mammals (represented by the salt marsh harvest mouse [SMHM] [*Reithrodontomys raviventris*]) and established a risk footprint as a boundary for potential removal action. The

BERA indicated that removal of the debris and contaminated soil would significantly reduce risk to both aquatic and wetland receptors.

After a review of the data in the draft final RI report (Tetra Tech 2002), the regulatory agencies identified the following data gaps: (1) groundwater characterization, (2) vertical extent of debris, and (3) characterization of the inorganic and organic chemicals in sediment beneath the debris. In response, the Navy performed additional field sampling and laboratory analysis and prepared an RI addendum to address those issues (Tetra Tech 2004).

Based on the evaluations of the spatial distribution of chemicals in sediments, soil, and groundwater, adequate data are available to show that concentrations of inorganic constituents in the area of debris at Site 30 are sufficiently high to present a potential risk to plants, benthic invertebrates, and aquatic birds. They also are high enough to pose a significant risk to the SMHM. It is evident that action is necessary to reduce the potential risk to human health and the environment. Therefore, an NTCRA was recommended for Site 30.

1.3 DESCRIPTION OF THE SITE AND CONCEPTUAL MODEL

Debris that consists of broken glass, burned metal, and partially burned wooden railroad ties litters the ground surface at much of the site. Glass and metal debris covers a triangular area that extends about 180 by 180 feet and into the open water and onto a peninsula (Figure 3). The lateral and vertical distribution of the debris are shown in Figure 4. Surface vegetation covers the debris in most areas. Figure 5 was developed to graphically depict the conceptual site model (CSM). This figure conceptually shows the primary exposure routes from contaminants in sediment and debris to potential receptors at Site 30.

1.4 POTENTIAL THREATS TO HUMAN HEALTH FROM SITE CONTAMINANTS

Currently, Site 30 is accessible only to authorized personnel, as it lies within the secure Tidal Area portion of NWS SBD Concord that is not open to the public. There are no current plans for base closure, and the site use is not expected to change in the near future. Potential carcinogenic risks and noncarcinogenic hazards were calculated for the HHRA based on the ratio of contaminant concentrations detected to residential preliminary remediation goals (PRGs). It is highly unlikely that the site would ever be developed for residential housing, since Site 30 currently consists of a marsh that would not be suitable for residential development without significant alteration. Additionally, maintenance of the wildlife resources of the tidal areas of Concord is consistent with the Integrated Natural Resources Management Plan (INRMP) for NWS SBD (NWS SBD 2002).

Conservatively assuming that the disposal site is developed for residential use and that no remediation occurs at the site, the concentrations of lead in soil and sediment could result in a child blood-lead concentration greater than the PRG of 10 micrograms per deciliter (µg/dL), the level of concern according to the California Health and Safety Code (Sections 12125 – 124165).

However, assuming that soil and sediment within the areas of the highest levels of inorganic contamination are removed, the risks identified at the disposal site would be protective of human health, even under a residential scenario.

1.5 POTENTIAL THREATS TO ECOLOGICAL RECEPTORS FROM SITE CONTAMINANTS

The current level of contamination by inorganic chemicals at the site poses probable risk to plant, invertebrate, and bird receptors. The risk to the SMHM, an endangered species, is significant. Areas with the highest levels of inorganic chemicals are located where the debris is most concentrated, which is along the shoreline and in the center of the site. Removal of the debris and metals-contaminated soil would significantly reduce risk to both aquatic and wetland receptors.

1.6 PLANNED REMOVAL ACTION TO ACHIEVE HIGH LEVEL OF PROTECTION FOR HUMAN HEALTH AND THE ENVIRONMENT

CERCLA and the NCP define removal actions to include actions that may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. As with the remedial action process, the NCP includes requirements for public participation during removal actions. To meet or exceed those requirements, the Navy will make the final EE/CA available to the public, when public comments will be accepted for up to 30 days. This period will be followed by a response to comments from the Navy.

The public is encouraged to review and comment on the proposed removal activities described in this final EE/CA. The complete record of environmental investigations conducted at NWS SBD Concord is maintained at the information repository, located at:

Concord Public Library
2900 Salvio Street
Concord, California 94519
(925) 646-5455

2.0 SITE CHARACTERIZATION

The following sections describe Site 30 at NWS SBD Concord. The site location, regional and site land use, history, and current operations are described.

2.1 SITE DESCRIPTION AND BACKGROUND

This section discusses the location and the background of the TBB Disposal Site.

2.1.1 Site Location

NWS SBD Concord is located in the north-central portion of Contra Costa County, California, about 30 miles northeast of San Francisco. The facility encompasses about 13,000 acres and is bounded by Suisun Bay to the north and by the City of Concord to the south and west (Figure 1). Currently, the facility includes two principal areas: the Tidal Area, and the Inland Area. The Tidal Area encompasses about 6,800 acres, the majority of which are wetlands. Site 30 is located in the Tidal Area beneath and west of TBB (Figure 2). Taylor Boulevard is the main access road to the Tidal Area.

Access to the Tidal Area and Site 30 is through a guarded gate off Port Chicago Highway, west of the main entrance to the Inland Area. Public access is restricted.

Site 30 is a marsh adjacent to an upland transition area (Figure 2). It has no paved areas, no buildings are present, and no physical evidence exists of any previous construction at the site. The nearest improvements are the TBB and the Taylor Boulevard Railroad Bridge, which span the eastern side of the site. The elevation at the center of the site is 6 feet higher than the surrounding marsh. No portion of the site is higher than 12 feet above mean sea level (msl). The Burlington Northern Santa Fe Railroad Company (BNSF) tracks are immediately south of the site, and Waterfront Road and the Union Pacific Railroad tracks are immediately north of the site.

Site 30 is triangular and is bordered by wetlands (referred to as Seal Creek Marsh) to the south and west (Figure 2). Seal Creek Marsh, adjacent to the site, is mostly open water, although the depth of the water varies seasonally. Pickleweed (*Salicornia virginica*) borders most of the shoreline.

Debris consisting of broken glass, burned metal, and partially burned wooden railroad ties litters the ground surface at much of the site. Glass and metal debris covers a triangular area that extends about 180 by 180 feet, into the open water, and onto a peninsula (Figure 4). Surface vegetation covers the debris in most areas.

2.1.2 Site Background and Historical Operations

The region that encompasses NWS SBD Concord was originally identified as Bay Point. The Tidal Area was originally occupied by the Pacific Coast Shipbuilding Company. The shipyard occupied the coastal area north of Site 30. Johnson Road was the only major route into the Tidal Area. In 1927, the Navy chose the site for naval ordnance operations because of its remote location and the availability of three major rail lines. Two of these rail lines bound Site 30 to the north and south (Figure 2). The rail lines were reportedly constructed before 1940. Construction of the waterfront handling facilities began in January 1942, and the facility was commissioned as the Naval Magazine Port Chicago in April 1942. Around this time, the name Bay Point was changed to Port Chicago. The Inland Area, located in the Diablo Creek Valley, was subsequently acquired and linked to the Tidal Area by the Port Chicago and Clayton Railroads. In 1963, the base was officially renamed Naval Weapons Station Concord. In April 1998, the base became the Weapons Support Facility Seal Beach, Detachment Concord.

On July 7, 1944, two munitions ships docked at a pier adjacent to the Tidal Area exploded. The pier (Pier No. 1) and both ships were destroyed, and 320 people were killed. Nearby residents in Port Chicago were injured. As a result, the Navy acquired all land within a 2-mile radius of the loading piers to protect the civilian population. The towns of Port Chicago and Nichols were purchased and demolished between 1968 and 1972 to provide a safety zone. The former town sites are now in the Tidal Area.

Seven aerial photographs from 1952 to 1996 and recent site visits suggest that Site 30 has not been graded for more than 45 years (Pacific Aerial Surveys [PAS] 1952, 1959, 1974 1984; PRC 1996). Slight changes in the site can be seen in each of the photographs, but there is no evidence of grading. The TBB and the railroad bridge immediately east of the disposal site were constructed sometime between 1939 and 1950. Changes in vegetation over time are apparent, but may occur because the photographs were taken in different seasons. The most notable change over time is the variation in the degree of inundation of Seal Creek Marsh. Although Seal Creek Marsh is readily identified in the aerial photographs, the degree of inundation varies significantly, probably with rainfall patterns. For example, flooding is not apparent in photographs before August 6, 1996 (PAS 1952, 1959, 1974, 1984), but Seal Creek Marsh is inundated in the photographs for August 6, 1996 (PRC 1996).

The dates of disposal and the source of the debris at the site are unknown. The debris includes a variety of blue-colored glass bottles and ceramic fragments. The waste appears to be old, consistent with the conclusions about the disposal area based on a review of aerial photographs.

2.1.3 Regional and Current Land Use

Regional land use at NWS SBD Concord is diverse, including industrial and residential areas, rangeland, and open space. Railroad land holdings and utility easements cross through the Tidal Area. Los Medanos Hills separate the Tidal and Inland Areas of NWS SBD Concord. This land is privately owned and is leased to the Pacific Gas and Electric Company (PG&E) and to ranchers for cattle grazing. Land north of State Route 4 (Figure 2) and west of NWS SBD Concord is zoned for industrial development. Several industrial firms operate along Port Chicago Highway near the main gate to NWS SBD Concord. Tosco Avon Refinery Company and Monsanto Chemical Company maintain facilities along Solano Way near Waterfront Road.

NWS SBD Concord was the major naval explosive ordnance transshipment facility on the West Coast. The facility provided storage, maintenance, and technical support for ordnance operations. In 1999, use and operation of the Tidal Area munitions facilities was transferred to the U.S. Army; however, responsibility for environmental cleanup remains with the Navy. No plans currently exist for base closure.

Site 30 is undeveloped and is not currently used for any purpose by NWS SBD Concord or the U.S. Army.

2.1.4 Geology

Naval Weapons Station SBD Concord is located about 30 miles east of the San Francisco Bay, within the geologically complex and tectonically active California Coast Range. The Tidal Area (Figure 1), which includes Site 30, lies within the southern part of a structural trough that is partially occupied by Suisun Bay. The Tidal Area is characterized by artificial fill material that overlies fine-grained Bay Mud sediments in elevated areas. Surface materials were naturally deposited in some areas, and no filling has occurred.

2.1.5 Hydrogeology

Regional and local hydrologic and hydrogeologic environments of the Tidal Area at NWS SBD Concord are presented in this section. Hydrologic data were derived from various surface and subsurface field investigations. Hydrogeologic data are based on geologic maps, data from subsurface field investigations in the Suisun Bay and Carquinez Strait area, and published materials (Tetra Tech 2002).

The Tidal Area, which includes Site 30, is characterized by a highly irregular piezometric surface and a very thin (or absent) vadose zone. Surface water features in the Tidal Area recharge local groundwater zones or act as a point of groundwater discharge. Groundwater from the surrounding hills flows northward toward Suisun Bay and discharges to surface waters in the Tidal Area. Surface water from the surrounding hills flows northward, toward Suisun Bay, in creeks and artificial ditches, canals, and culverts.

Groundwater at the Tidal Area occurs in a shallow, unconfined water-bearing zone that is composed of silty clays. As NWS SBD Concord grew, drainage was modified by adding drainage channels and by filling both natural and manmade channels with sandy fill materials and silty clays. The result is a complex subsurface characterized by silty clays and linear bodies of sandy fill material.

Tidally influenced sloughs in the lowlands near Suisun Bay route bay water to and from the Tidal Area. Hastings Slough, in the western portion of the Tidal Area, extends from Suisun Bay to the Tosco Avon Refinery in Martinez. Mount Diablo Creek (called Seal Creek on NWS SBD Concord) drains into Hastings Slough. Seal Creek and Hastings Slough are tidally influenced sloughs adjacent to Site 30. Although Seal Creek and Hastings Slough are tidally influenced, significant tidal fluctuation does not extend into Seal Creek Marsh. Based on repeated field observations, water levels at Site 30 fluctuate less than 6 inches during daily tidal cycles.

Groundwater in the Tidal Area is generally a few feet below ground surface (bgs) throughout the year. Groundwater elevations at Site 30 are less than 1 foot bgs at the margin of Seal Creek Marsh. The drainage pattern of Seal Creek Marsh near Site 30 has been altered through the years by manmade features. Active railroad lines border Site 30 to the north and south (Figure 2). In addition, drainage ditches dug by the Contra Costa County Mosquito Abatement District are present in Seal Creek Marsh.

Four major hydrogeologic units were identified beneath the Tidal Area and within 100 feet of the surface. The four units were (1) bay sediments (clay with sand and peat stringers), (2) Yerba Buena mud (clay with minor sand lenses), (3) recent alluvium (including sands, silts, and clays), and (4) fluvial or estuarine sediments (predominantly micaceous sand). In addition, artificial fill is present in the upper surface at several locations in the Tidal Area, particularly at Site 30. Recent alluvium and bay sediments, consisting of silty clay, may be the only hydrogeologic units present at Site 30.

2.1.6 Regional Ecology

Site 30 can be subdivided into three habitats (Figure 3): an open water aquatic habitat, a transitional shoreline, and a wetland and upland transitional habitat that appears strongly influenced by moisture levels in soil. Three dominant vegetation types are present in the wetland and upland transitional habitat (Figure 3); however, a true upland plant community is not present at Site 30.

2.1.6.1 Aquatic Habitat

The aquatic habitat consists of shallow, open water of varying salinities, interspersed with "islands" of vegetation; dense pickleweed root systems and thick algal mats are abundant in the shallowest waters. The dominance of algal mats varies with season, as does the composition of the algal species. Cattail clumps occur in deeper areas. The bottom appears to be a rich organic matrix of decaying algae and detritus. This habitat may contain amphipods, clams, polychaete worms, and other species of filter- and deposit-feeding benthic invertebrates.

2.1.6.2 Shoreline

The shoreline is the transition area between the aquatic and wetland and upland transitional habitats. The boundary of the shoreline fluctuates over time because of seasonal variation in the water level of Seal Creek Marsh, resulting from annual rainfall and tidal influence. For this reason, the shoreline is included as part of both the aquatic and wetland and upland transitional habitats. The shoreline is shown in stippled colors on Figure 3.

The dominant plant along the shoreline is pickleweed. The plant is a colonial halophyte that reproduces both vegetatively and by seed, resulting in dense stands. Pickleweed is adapted to highly saline habitats, absorbing salt and water through its roots and storing salt in aboveground tissues. Pickleweed, with its elaborate root system, traps detritus and sediment particles, which produce rich organic sediment; this sediment serves as a primary source of food for many benthic invertebrates, particularly deposit and filter feeders. This moist, shaded pickleweed niche is the home for numerous benthic invertebrates, including various amphipod species. Pickleweed is also a primary source of food for the SMHM, although no salt marsh harvest mice have been reported in the area. The Navy conducted a small mammal survey at Site 30 in late fall 1998; no SMHM were trapped.

Predominant bird species detected in the area of Seal Creek Marsh during general bird surveys conducted under the INRMP included the northern shoveler (*Anas clypeata*), American coot (*Fulica Americana*), long-billed dowitcher (*Limnodromus scolopaceus*), mallard (*Anas platyrhynchos*), and gadwall (*Anas strepera*). Complete survey data are presented in Downard (1999). Bird species observed at Site 30 during various field activities included the black-necked tilt (*Himantopus mexicanus*), killdeer (*Charadrius vociferous*), and mallard.

Mammals common in the wetlands of the Seal Creek Marsh include small- to medium-sized omnivores such as the western harvest mouse (*Reithrodontomys megalotis*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), and long-tailed weasel (*Mustela frenata*).

2.1.6.3 Wetland and Upland Transitional Habitat

The shoreline represents the lowest region of the wetland and upland transitional habitat (Figure 3). Gumplant (*Grindelia* sp.) grows in dense clumps interspersed among the pickleweed on the tip of the peninsula and in the eastern portion of this lowest region.

Grasses such as saltgrass (*Distichlis spicata*), are abundant in the mid-region of the wetland and upland transitional habitat. Gumplant is also common. Gumplant often grows interspersed among the grasses, forming loosely spaced aggregations. Australian salt bush (*Atriplex semibaccata*) and spearscale (*Atriplex triangularis*) are also present, randomly growing among the grasses. Curly dock (*Rumex crispus*) occurs in small numbers. Alkali heath (*Frankenia salina*) also occurs sporadically.

Grasses are less abundant and shrubs dominate in the upper region of the wetland and upland transitional habitat. Coyote brush (*Baccharis pilularis*), fennel (*Foeniculum vulgare*), and artichoke thistle (*Cynara caraduncul*us) occur throughout this region. Gumplant is also present, but generally in smaller numbers, with the exception of a dense stand in the southwestern corner of the habitat.

The factor that probably controls distribution of plants within the wetland and upland transitional habitat is moisture in soil. The moisture content of surface soil declines and the abundance of obligate wetland species decreases as the elevation at Site 30 increases from sea level to 10 feet and as distance from the shoreline increases.

2.1.7 Climate and Meteorology

Contra Costa Country normally has dry, warm summers and cool, moderately wet winters. Mean annual precipitation for NWS SBD Concord is 14 inches (Ecology and Environment 1983). About 84 percent of the rainfall occurs from November through March. Regional rainfall varies from 13 inches in the eastern portion of Contra Costa County to more than 30 inches on the upper slopes of Mount Diablo.

The average local temperature varies from 45°F in January to 75°F in August. Record highs and lows of 106°F and 16°F were recorded near NWS SBD Concord.

Prevailing winds blow from the west through the wind gap formed by San Francisco Bay and Carquinez Strait. As a result, the Pacific Ocean and Suisun Bay have a moderating effect on the microclimate of NWS SBD Concord. These westerly winds are dominant during the summer and minimal from November through February. Wind directions and speed are monitored at a PG&E power plant in Pittsburg, a few miles east of NWS SBD Concord. The wind blows from southwest to west-northwest at a mean speed of 12 miles per hour 65 percent of the time.

2.2 HISTORY OF PREVIOUS REMOVAL ACTIONS, INVESTIGATIONS, AND ACTIVITIES

This section discusses previous removal actions, initial remedial investigations, and sampling. Previous investigations at the Site 30 include five soil and sediment sampling events, sampling focused for the ERA, and groundwater samples collected as part of the RI process for the site. A screening-level HHRA and BERA were also conducted as part of the RI for the site.

2.2.1 Previous Removal Actions

No previous removal actions have been conducted at Site 30.

2.2.2 Initial Investigations

A summary of the initial investigations at Site 30 is presented in Table 1.

2.2.3 Remedial Investigations

In August 1999, a final report and summary work plan summarized available data and presented a screening-level HHRA and a screening-level ERA (Tetra Tech 1999b). A BERA was recommended based on the conclusions of the screening level ERA. Additional samples to address the data needs of the BERA were collected February to March 2000 as part of a supplemental RI; these data are presented in Table 1.

2.3 NATURE AND EXTENT OF CONTAMINATION AND DEBRIS

The following sections summarize the nature and extent of contaminants and debris at Site 30 for inorganic and organic chemicals in sediment and groundwater. Figure 3 shows sampling locations for surface and subsurface sediment samples, composite sediment samples, collocated tissue samples, debris sample locations, and monitoring wells. Pickleweed and amphipod tissue samples were analyzed for metals and percent moisture. Table 2 summarizes the evaluation of sediment and groundwater for Site 30.

2.3.1 Extent of Site Debris

Test holes were dug at 22 locations across Site 30 to characterize the vertical and lateral extent of the debris present at the site. The locations of these test holes are identified by triangular symbols on Figure 3 and are numbered DB01 through DB22. Profiles of the debris test holes with soil type and vertical extent of debris are illustrated on Figure 4.

The vertical extent of the debris ranges from 4 feet bgs at the end of the peninsula (SB201) to 1 foot bgs in the central portion of the site (SB-205) (Figure 4).

The peninsula of Site 30 contains the largest amount of debris. The subsurface debris along the peninsula consists primarily of glass fragments, intact glass bottles, and what appears to be highly rusted metal debris (rust flakes and fragments). The rusted material is essentially mixed with the small amount of sediment that composes the debris matrix on the peninsula. No intact metal containers or pieces of metal that resembled containers were recovered in the test holes dug on the peninsula. Generally, the debris was contained in an approximately 50/50 matrix of soil and debris near the surface in test holes where debris was found (0 to 0.5 foot bgs) and was graded to nearly 100 percent debris with depth. The debris in the peninsula area extends to 3.5 feet bgs (Tetra Tech 2002, 2004).

Debris was not found in most of the debris test holes dug on the eastern side of the site, except in test holes DB01, DB11, DB12, and DB13 (Figures 3 and 4). Based on findings from the test holes, surface and subsurface debris in the wetland and upland transitional habitat is found throughout the peninsula, north to test hole DB013, and extending southeast to just west of test hole DB05. This area is delineated on Figure 3. Subsurface debris was generally found in the areas where debris was observed on the surface.

The extent of debris in the aquatic portion of Site 30 was estimated by probing the submerged sediments of the offshore area with a shovel and a 5-foot length of plastic pipe. Based on these methods, debris appears to extend about 10 to 20 feet offshore from the area identified on the "wetland and upland transitional" portion of the site (Figures 3 and 4). This debris appears to extend down 1 to 2 feet below the sediment surface. About 6 inches of sediment covers the debris in the area south of the peninsula. The debris appears to be heaviest close to the shoreline and is mixed with sediment in most areas. The stippled offshore area shown on Figure 3 delineates an area of scattered surface debris, based on sediment probing conducted while field crews traversed this area.

2.3.2 Extent of Site Sediment and Groundwater Contamination

Arsenic, cadmium, copper, lead, selenium, and zinc were detected in sediment beneath the debris at concentrations above benchmark screening values (Tetra Tech 2002, 2004). Concentrations of metals were highest on the peninsula in areas where the debris extends into the groundwater. Concentrations beneath the debris were not elevated at location SB205, however, which is in the center of the site, where debris does not intersect groundwater, (Tetra Tech 2002). Surface sediment and water samples collected about 10 feet offshore did not contain elevated levels of metals (Tetra Tech 2002). The sediment data collected suggest that contaminants may be leaching from the debris to subsurface sediment in low-lying areas of the site closest to the shoreline, where the debris lies within the groundwater.

The distribution of total petroleum hydrocarbons (TPH) in the sediment samples suggested a limited release of petroleum hydrocarbons. This limited release was possibly caused by leakage of oil from construction vehicles and equipment dating from construction of the Taylor Boulevard automobile and railroad bridges (Tetra Tech 2002).

The three groundwater monitoring wells installed were sampled using low-flow-rate sampling methodology (Tetra Tech 2004). Groundwater level measurements indicated that groundwater flowed to the west (0.002 foot per foot gradient) and that the potentiometric surface was relatively flat (Tetra Tech 2004). These measurements were recorded in November 2003 at the beginning of the wet season and then again in February 2004 at the end of the wet season. Results from groundwater sampling are summarized in Table 2.

Although aluminum, arsenic, copper, mercury, and nickel were detected at concentrations above groundwater screening criteria, only arsenic and aluminum were notably elevated above screening criteria (Tetra Tech 2004). Aluminum is not expected to be a problem because the pH of the soil is relatively neutral, and the mobility of aluminum is near minimum in pH neutral soils.

The highest concentration of arsenic was detected in the sample from monitoring well GW01, which is upgradient of the debris field. The exact source of arsenic in the sample from monitoring well GW01 is unknown; however, it is most likely related to the debris. The hydraulic gradient for the site is nearly flat which, along with the generally low hydraulic conductivity in the subsurface, suggests that the rate of groundwater flow across the site is very low. Therefore, potential transport of arsenic from the debris in groundwater is not expected to result in elevated concentrations of arsenic at significant distances from the waste. Surface water transport could cause elevated concentrations of arsenic in groundwater if groundwater near the debris was discharging to surface water and arsenic-containing surface water was then recharging the groundwater near well GW01. Well GW01 is about 40 feet from the primary area of debris. Surface water samples collected by the San Francisco Bay Water Board do not suggest that arsenic has been released from groundwater at the site at concentrations that may be causing adverse ecological effects (Tetra Tech 2002).

Areas with the highest levels of contamination by inorganic chemicals are located where the debris is most concentrated: along the shoreline and in the center of Site 30. Removal of the debris and contaminated soils would significantly reduce risk to both aquatic and wetland receptors.

2.3.3 Contamination Fate and Transport

Inorganic chemicals (certain metals) are the main chemicals of concern. The primary migration pathway for these chemicals at Site 30 is through leachate migration generated by infiltration in surface water. Except for the peninsula or areas directly adjacent to the shoreline, chemicals have not migrated vertically by leaching (Tetra Tech 2002), as evidenced by the lack of contamination in soil at depths below 1 foot bgs. Information on the hydrology and geochemistry indicates that inorganic chemicals will not leach into the surface water. For example, the high pH of the soils (7.5 to 8.2) (Tetra Tech 2002) indicates that the metals are in less soluble form and are more likely to bind to the soil, in turn reducing the leaching potential of metals. In addition, there is very little inundation of the contaminated soils because water levels at Site 30 fluctuate less than 6 inches during daily tidal cycles (Tetra Tech 2002); therefore, the likelihood that metals would leach through surface water infiltration is remote. The hatched area in Figure 3 shows the approximate seasonal water level variation. The less soluble forms of metals would likely bind to the highly organic soils in the submerged area of the wetland, reducing the opportunity for migration of

contaminants. Furthermore, the surface water data Water Board collected in December 2001 indicate that Site 30 is not a source of contamination to Seal Creek Marsh (Tetra Tech 2002).

Based on analytical results, contaminant concentrations in soil and sediment were highest on the peninsula in areas where the debris extends into the groundwater. However, contaminant concentrations in sediment beneath the debris were not elevated at the sampling location in the center of the site, where debris does not intersect groundwater. The results of the 2003 investigation of groundwater suggest that contaminants may be leaching from the debris to subsurface sediment in low-lying areas of the site closest to the shoreline, where the debris is within the groundwater.

2.4 EVALUATION OF RISK FOR TAYLOR BOULEVARD BRIDGE DISPOSAL SITE

A screening-level human health risk assessment and baseline ecological risk assessment were performed as part of the RI for Site 30. The following sections summarize the risk evaluations as presented in the RI and RI addendum (Tetra Tech 2002, 2004). Although the site poses a risk for potential human receptors, humans are not likely to use the property as residents. A greater risk is posed to ecological receptors.

2.4.1 Summary of Human Health Risk Evaluation

The screening-level HHRA conducted for Site 30 indicated that chemicals of potential concern (COPC) are currently present at levels that could result in adverse health effects for residents. The data used in the evaluation included results from investigations in February 1996, March and October 1997, February and June 1998, and February 2000. COPCs were selected from the pooled data from these investigations. All detected chemicals were selected as COPCs, with the exception of metals. Metals were selected as COPCs only if the maximum detected concentration was above the 99th percentile of the Tidal Area ambient level or if it was not considered an essential nutrient. The 95 percent upper confidence limit (UCL_{95}) was then calculated for each COPC selected.

The potential carcinogenic risks and noncarcinogenic hazards were estimated based on comparing the UCL_{95} to EPA Region 9 residential PRGs. Human health-based target limits for each of the COPCs were selected considering the residential exposure scenario. This scenario is highly conservative because Site 30 is currently a tidal marsh and would not be suitable for a future residential development. However, the residential scenario provides health-protective target criteria without imposing land use restrictions; therefore, residential PRGs were used as a benchmark to confirm that site conditions after remediation will be protective of human health for all possible future uses. Site 30 was subdivided into two areas for the screening evaluation: (1) Area A, the center of the site where concentrations of lead exceeded 400 milligrams per kilogram (mg/kg) (the 1999 residential PRG for lead), and (2) Area B, the remaining area outside of Area A (the 400 mg/kg isopleth for lead). Figure 6 shows the locations where lead concentrations exceed 400 mg/kg (designated using the * symbol). As shown on Figure 6, all locations that exceeded 400 mg/kg were within the risk footprint.

The ratio of the UCL_{95} concentration to the residential PRG ratio was multiplied by 1×10^{-6} to evaluate carcinogenic risk. The sum of the carcinogenic ratios within Area A was 4×10^{-4}, with arsenic as the primary risk driver. The COPCs that yielded results greater than 1×10^{-6} were arsenic (3.6×10^{-4}), cadmium (1.5×10^{-6}), chromium (1.8×10^{-6}), benzo(a)pyrene (9.7×10^{-6}), and benzo(b)fluoranthene (3.2×10^{-6}). The hazard index (HI) was estimated by calculating the ratio (UCL_{95}/noncancer endpoint residential PRG) for the noncancer hazard evaluation. An HI of 1 indicates that no noncancer adverse health effects are expected to occur as a result of exposure to on-site COPCs. The sum of the HIs was 22 for Area A, indicating the potential for adverse health effects from residential use of the site. The individual HI for arsenic, copper, and iron was greater than 1.

The UCL_{95} concentration for lead (3,470 mg/kg) in Area A exceeds the EPA Region 9 residential PRG of 400 mg/kg.

The sum of the carcinogenic ratios within Area B was 3×10^{-5}. Arsenic was the only COPC that posed an estimated risk that exceeded 1×10^{-6}. The HI of 4 indicates the potential for adverse health effects from residential use of Site 30. Iron was the only COPC that yielded an individual HI greater than 1. The UCL_{95} concentration for lead (210 mg/kg) in Area B is below the EPA Region 9 PRG.

Based on the results of the screening evaluation conducted in the RI (Tetra Tech 2002), the following COPCs were identified as risk or hazard drivers to human health (estimated risk above 1×10^{-6} or HI above 1): arsenic, cadmium, copper, chromium, iron, lead, benzo(a)pyrene, and benzo(b)fluoranthene (Table 3).

These COPCs are present at higher concentrations at the center of the site, within the risk footprint (Figure 6). Concentrations of COPCs in the remaining soil and sediment would be within EPA target levels that are considered protective of human health if remediation were conducted to remove elevated concentrations of inorganic compounds within the risk footprint (Table 4). Potential exposures to COPCs found outside the risk footprint would not be expected to result in adverse health effects (Tetra Tech 2002). After soil and sediment are remediated within the risk footprint, the only COPCs that would remain at concentrations above EPA Region 9 residential PRGs would be arsenic and iron. Although arsenic would remain at concentrations above the EPA 9 PRG after remediation, concentrations would be below the Tidal Area ambient value (27 mg/kg) at all locations. The Navy policy on background states that naturally occurring and anthropogenic chemicals that are present at levels below background should be eliminated from the baseline risk assessment process and should not be included in remediation cleanup projects (Navy 2000). The Tidal Area ambient concentrations represent background conditions at the site.

A risk footprint was devised in the RI report, which includes sample locations where unacceptable risk to human health based on a residential scenario exists and follows the 400 mg/kg isopleth for lead (Figure 6). Sampling locations and chemical data were evaluated as they relate to the risk-based cleanup goals to identify an area of remediation. This evaluation is discussed in Section 4.0.

2.4.2 Summary of Ecological Risk Evaluation

Five assessment endpoints, ranging from plants to higher trophic-level receptors, were identified for specific evaluation in the BERA. Assessment endpoints include the following:

- Maintenance and protection of wetland and upland transitional plants
- Protection of populations of benthic invertebrates
- Protection of populations of waterfowl (mallard)
- Protection of populations of shorebirds (black-necked stilt)
- Protection of individual SMHM

Chemicals of ecological concern (COEC) for Site 30 were identified separately for plants, invertebrates, and birds and mammals. COECs were identified for plants and benthic invertebrates based on a comparison of the UCL_{95} concentration in soil compared with: (1) ambient values from site-specific sampling at the Tidal Area and from regional bay studies, and (2) toxicity-based benchmarks. COECs for birds and mammals were identified based on a comparison of the UCL_{95} to Tidal Area ambient values.

Risks to each type of receptor from chemicals identified as COECs were then characterized using a weight-of-evidence approach to evaluate whether the site poses a significant risk to ecological receptors that warrants additional evaluation or a response action. One of the primary objectives of the BERA was to establish a risk footprint to help establish the boundary for the removal action.

Arsenic, copper, selenium, and zinc may be available for uptake for plants at concentrations greater than are required for healthy growth based on a comparison to Oak Ridge National Laboratory (ORNL) benchmark for plants (Tetra Tech 2002). Bioaccumulation factors (BAFs) greater than 1 for the pickleweed provided another line of evidence for potential risk. A BAF greater than 1 means that the chemical has accumulated in the tissue of the organism to a concentration higher than in the associated media. A plant or animal can take up or consume contaminated media and be exposed to the chemical but not accumulate it because of the relative rate of absorption, metabolism, and excretion.

The risk to benthic invertebrates was evaluated based on the following lines of evidence. COECs were identified based on a hazard quotient (HQ) approach. First, sampling locations where the mean effects range-median (ER-M) quotient was greater than 1.5 were identified. Then, COECs with HQs greater than 1 were identified across the nine sampling locations where mean ER-M quotients were greater than 1.5. Lastly, mean HQs (across the nine locations) were calculated for each COPEC that had yielded at least one HQ greater than 1. COECs identified using this process were copper, lead, selenium, and zinc.

The risk to birds and mammals was evaluated quantitatively using an HQ approach. Site-specific daily doses (estimated by food-chain modeling) were compared with toxicity reference values (TRV), with the HQ equal to the dose divided by the TRV. The derivation of TRVs and the use of food chain analysis are described in detail in a technical memorandum (Engineering Field Activity West 1998). A qualitative assessment of risk was performed based on available information in the scientific literature for COECs that have not been assigned a TRV. A detailed description of the risk characterization for birds and mammals is provided in the draft final RI (Tetra Tech 2002).

As described above, risk to ecological receptors from site contamination was evaluated using a variety of approaches, such as comparison of concentrations at the site with available screening values, bioassays, measures of bioaccumulation, food chain analysis, and literature reviews. Based on the risk characterization, the following conclusions were made in the RI (Tetra Tech 2002):

- For plants, concentrations of arsenic, copper, selenium, and zinc may be available for uptake at concentrations greater than required for healthy growth.
- For benthic invertebrates, potential risk from exposure to copper, lead, selenium, and zinc may exist.
- For aquatic birds risk from exposure to arsenic, cadmium, copper, lead, mercury, selenium, and zinc may exist.
- Risk to the SMHM may exist from exposure to arsenic, copper, lead, mercury, selenium, and zinc.

In summary, COECs that posed a risk to one or more of the assessment endpoint receptors at Site 30 included arsenic, cadmium, copper, lead, mercury, selenium, and zinc. Copper and zinc were COECs to all receptors, while mercury was a COEC only to aquatic birds and the SMHM. Lead was a COEC to all receptors except plants. Cadmium was a COEC only to aquatic birds

Areas with the highest levels of contamination by inorganic chemicals are located where the debris is most concentrated, which is along the shoreline and in the center of the site. Removal of the debris and impacted soil and sediment would significantly reduce risk to both aquatic and wetland receptors.

The risk footprint developed (Figure 6) shows the overlap of risk to each receptor by location to identify areas of highest risk and to help establish the boundary for the removal action. A proposed footprint for excavation based on the risk footprint is discussed in Section 4.0.

3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section discusses: (1) the statutory framework, (2) the determination of the scope of the removal, (3) the determination of removal schedule, (4) the applicable or relevant and appropriate requirements (ARARs), and (5) the RAOs for the removal action planned at Site 30.

3.1 STATUTORY FRAMEWORK

This removal action is being taken pursuant to CERCLA and the NCP, under the delegated authority of the Office of the President of the United States, by Executive Order (EO) 12580. This EO authorizes the Navy to conduct removal actions. The removal action is non-time critical because no immediate risk exists to human health. The public comment period for this EE/CA will provide the opportunity for public input to the cleanup process.

The Navy is the lead agency for the removal action. As the lead agency, the Navy has the authority to select the removal action methodology, while considering public and regulatory participation. The Naval Facilities Engineering Command, Southwest Division, is the regional manager of the Navy's CERCLA program.

This EE/CA complies with the requirements of CERCLA and the Superfund Amendments and Reauthorization Act of 1986; the NCP at 40 CFR Part 300; the Defense Environmental Restoration Program at Title 10 of U.S.C, Section 2701 et seq.; and EO 12580. This EE/CA is being prepared under 40 CFR Part 300.415(b) (2). In addition, the Navy will conduct the removal action in compliance with CERCLA.

Soil impacted by chemicals and solid waste at Site 30 contains lead, polynuclear aromatic hydrocarbons (PAH), metals, and debris (solid waste). The debris found in the various test pits throughout Site 30 consisted of glass, metal, and wood. Data presented in the RI (Tetra Tech 2002) shows that elevated chemical concentrations posing a risk to site receptors were collocated with elevated levels of lead. These data are summarized in Table 4 and Figure 8.

The proposed removal action is intended to reduce the threat of human and various ecological receptors exposure to soil impacted by chemicals and solid waste at Site 30.

The proposed removal action will address the threats posed by the following conditions at Site 30, pursuant to the NCP:

- **Actual or potential exposure of nearby human populations, animals, or the food chain to hazardous substances, pollutants, or contaminants (40 CFR Part 300.415(b)(2)(i).** People residing or working at the site may be exposed through excavation, erosion, or other intrusive activities to soil contaminated with lead, metals, and PAHs through direct contact or incidental ingestion. Lead and PAHs are hazardous substances known to pose a threat to human health.
- **High levels of hazardous substances, pollutants, or contaminants in soil largely at or near the surface that may migrate (40 CFR Part 300.415(b)(2)(iv).** Lead, metals, and PAH at concentrations that exceed residential PRGs (EPA 1999) are present in soil at and near the surface of the site. This contamination may adversely affect public health and welfare if it is not removed or isolated.

3.2 DETERMINATION OF REMOVAL SCOPE

The removal action is intended to restrict the pathway for human exposure to hazardous substances in soil at Site 30. The RI process identified a risk footprint based on the screening-level HHRA and BERA that encompasses the risk to both human and ecological receptors. Removal of soil that contains elevated concentrations of inorganic compounds and the debris will significantly reduce the risk to both aquatic and wetland receptors and will be protective of human health. Confirmation samples will be collected to confirm that the goals of the removal action have been achieved. This action is intended to serve as the final action necessary for residential human health and ecological risks associated with the known contamination within Site 30.

3.3 DETERMINATION OF REMOVAL SCHEDULE

This final EE/CA identifies and evaluates removal alternatives for Site 30. This EE/CA will be available for public review and comment for 30 days. The Navy will review the comments and, where appropriate, incorporate responses to public and regulatory agency comments into the action memorandum.

It is anticipated that the removal action will require 2 to 4 months, including mobilization and demobilization. Reestablishment of the pickleweed habitat could require 1 to 3 years.

3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The NCP states, "Removal actions . . . shall to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under Federal environmental or state environmental or facility citing laws" (40 CFR Part 300.415[i]).

An evaluation of ARARs for this EE/CA can be found in Appendix A. The following sections provide an overview of the ARARs process and a summary of the ARARs that potentially affect RAOs and the removal action alternatives.

3.4.1 Overview of Applicable or Relevant and Appropriate Requirements

The identification of ARARs is a site-specific determination and involves a two-part analysis. First, a determination is made about whether a requirement is applicable. Second, if it is not applicable, a determination is made about whether it is relevant and appropriate. A requirement is deemed applicable if the specific terms of the law or regulation directly address the chemicals of concern (COC), remedial action, or place involved at the site. If the jurisdictional prerequisites of the law or regulation are not met, a legal requirement may nonetheless be relevant and appropriate if the site's circumstances are sufficiently similar to circumstances in which the law otherwise applies and it is well suited to site conditions.

A requirement must be substantive to constitute an ARAR for activities conducted on site. Procedural or administrative requirements, such as permits and reporting, are not ARARs.

As the lead federal agency, the Navy has the primary responsibility for identifying federal ARARs at Site 30. For a state requirement to qualify as an ARAR, it must be: (1) a state law, (2) promulgated, (3) substantive, (4) from an environmental or facility siting law, (5) more stringent than the federal requirement, (6) identified in a timely manner, and (7) consistently applied. ARARs and to-be-considered (TBC) criteria are generally divided into three categories: chemical-, location-, and action-specific. TBC means that an environmental standard, requirement, criteria, or limitation is not legally applicable or relevant and appropriate, but is nevertheless useful information "TBC" in developing removal alternatives. ARARs and TBCs affecting RAOs and removal action alternatives are discussed in the following section.

3.4.2 Applicable or Relevant and Appropriate Requirements and To Be Considered Criteria Affecting Removal Action Objectives and Alternatives

3.4.2.1 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in establishment of numerical cleanup values. These values establish the acceptable amount or concentration of a chemical found in, or discharged to, the ambient environment that is protective of human health or ecological receptors. The only potential chemical-specific ARARs are the requirements applicable to identification and land disposal of hazardous waste. If the removal action generates contaminated media that meets the definition of a Resource Conservation and Recovery Act (RCRA) hazardous waste, then the substantive provisions of the following RCRA requirements are potential ARARs:

- California Code of Regulations (CCR), Title 22, Section (§) 66261.21
- California Code of Regulations, Title 22, § 66261.22(a)(1)
- California Code of Regulations, Title 22, § 66261.23
- California Code of Regulations, Title 22, § 66261.24(a)(1)
- California Code of Regulations, Title 22, § 66261.100

RCRA land disposal restrictions at Title 22 of CCR Section 66268.1(f) are also potential ARARs for discharging waste to land.

The following state requirements are also potential ARARs:

- California Code of Regulations, Title 27 §§ 20210, 20220 and 20230 (defining designated waste, nonhazardous waste, and inert waste)
- California Code of Regulations, Title 22, § § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F) (defining non-RCRA hazardous waste)

3.4.2.2 Location-Specific ARARs

Location-specific ARARs are restrictions on concentrations of hazardous substances or the conduct of activities as a result of the characteristics of the site or its immediate environment. The following location-specific ARARs were identified for Site 30:

- Coastal Zone Management Act (Title 16 U.S.C. 1456[c] and its implementing regulation, 15 CFR 930) (requires that activities near a coastal zone be conducted in a manner consistent with approved state management programs).
- The Endangered Species Act (Title 16 U.S.C. 1531 through 1543) (requires that federal agencies not jeopardize the continued existence of a listed species of cause the destruction or adverse modification of critical habitat).
- 40 CFR Section 6.302(a), implementing Executive Order 11990 (provides that actions must be taken to minimize the destruction, loss or degradation of wetlands).
- Clean Water Act (33 U.S.C. 1344) Section 404 (prohibits discharge of dredged or fill material into a wetland without a permit).
- 40 CFR Section 6.302(b) and 40 CFR pt. 6, app. A, excluding § 6(a)(2), 6(a)(4), and 6(a)(6), implementing Executive Order 11988 (provides that actions must be taken to minimize potential harm in floodplains).

CDFG provided a list of proposed State ARARs for Site 30 in a memo dated August 3, 2004. The Navy has concluded that of the requirements provided by CDFG, the following are ARARs:

- California Fish and Game Code § 5650(a), (b) & (f): This section prohibits depositing or placing where it can pass into waters of the state any petroleum products, factory refuse, sawdust, shavings, slabs or edgings and any substance deleterious to fish, plant life or bird life.
- California Fish and Game Code § 3005: This section prohibits the taking of birds and mammals, including taking by poison.
- California Fish and Game Code § 1908: This section prohibits the taking of rare or endangered native plants.
- California Fish and Game Code § 2080: This section prohibits the take of any endangered or threatened species.
- California Fish and Game Code § 3511: This section provides that it is unlawful to take or possess listed fully protected birds.
- California Fish and Game Commission Wetlands Policy: This policy seeks to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California.

- California Fish and Game Code § 4700: This section prohibits the take or possession of listed fully protected mammals or their parts.
- California Fish and Game Code § 3503: This section prohibits the take, possession, or needless destruction of the nest or eggs of any bird except as otherwise provided.
- California Fish and Game Code § 3800: This section prohibits the take of nongame birds except in accordance with the regulations of the commission.
- California Fish and Game Code § 8500: This section provides that it unlawful to possess or take, unless otherwise expressly permitted, mollusks, crustaceans, or other invertebrates unless a valid tidal invertebrate permit has been issued.

CDFG also identified the following requirements, which the Navy has determined are neither applicable nor relevant and appropriate to Site 30:

- California Fish and Game Code § 5050: This section prohibits the take or possession of fully protected reptiles and amphibians.
- California Fish and Game Code § 3503.5: This section prohibits the take, possession, or destruction of any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nests or eggs of such birds.
- California Fish and Game Code § 4000: This section provides that a fur-bearing mammal may be taken only with a trap, a firearm, a bow and arrow, poison under a proper permit, or with the use of dogs.
- California Fish and Game Code § 4150: This section provides that nongame mammals may not be taken or possessed except as otherwise provided.
- California Code of Regulations, Title 14 § 472: This regulation provides that nongame birds and mammals may not be taken except as provided in this section.
- California Code of Regulations, Title 14, section 40: This regulation makes it unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or parts thereof, unless a permit has been issued.
- California Code of Regulations, Title 14, section 460: This regulation makes it unlawful to take fisher, marten, river otter, desert kit fox, and red fox.
- California Code of Regulations, Title 14, section 465: This regulation states that fur-bearing mammals may be taken only with a firearm, a bow and arrow, or with the use of dogs or traps in accordance with Section 465.5 and Section 3003.1 of the Fish and Game Code.

3.4.2.3 Action-Specific ARARs

Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the specific removal or remedial activities selected and suggest how a selected removal alternative should be achieved. These action-specific requirements do not, in themselves, control the removal alternative; rather, they indicate how a selected alternative must be conducted. Therefore, action-specific ARARs are identified after an alternative has been selected because they depend on the action selected. Potential action-specific ARARs are discussed below.

Excavation

RCRA, the Federal Hazardous Materials Transpiration Law, the Clean Air Act, and the Clean Water Act are potential ARARs for excavation.

Resource Conservation and Recovery Act

- California Code of Regulations, Title 22, §§ 66261.10 and 66261.11 (determination of hazardous waste)
- California Code of Regulations, Title 22, § 66268.7 (prohibit disposal of hazardous waste unless treatment standards are met)
- California Code of Regulations, Title 22, § 66262.30 (RCRA packaging requirements)
- California Code of Regulations, Title 22, § 66262.31 (RCRA labeling requirements)
- California Code of Regulations, Title 22, § 66262.32 (RCRA marking requirements)
- California Code of Regulations, Title 22, § 66262.33 (RCRA placarding requirements)
- California Code of Regulations, Title 22, §§ 66262.20, 66262.21, 66252.22 and 66262.23 (RCRA manifest requirements)
- 40 C.F.R. § 264.554(d)(1)(i–ii) and (d)(2), (e), (f), (h), (i), (j), and (k) (temporary staging piles)

Federal Hazardous Materials Transportation Law

Potential ARARs for transporting hazardous waste:

- Federal Hazardous Materials Transportation Law, Title 49 U.S.C. 5101 through 5127, Title 49 CFR 171.2(f), 171.2(g), 172.300, 172.301, 172.302, 172.303, 172.304, 172.312, 172.400, and 172.504 (requirements for transporting hazardous wastes, including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements).

Clean Air Act

The following Bay Area Air Quality Management District (BAAQMD) regulations are potential ARARs for excavation:

- Regulation 6-302: Opacity Limitation (prohibiting emissions for a period aggregating more than 3 minutes in any hour to greater than or equal to 20 percent opacity)
- Regulation 6-305: Visible Particles (prohibiting the emissions of particles in sufficient number to cause annoyance)
- Regulation 8, Rule 40 (Provides requirements for maintaining, covering and stock-piling excavated soil)

Clean Water Act

State Water Resources Control Board (SWRCB) Order 99-08 is the State of California General Permit for Discharge of Stormwater Associated with Construction Activities, issued pursuant to 40 CFR 122 Subpart C. The substantive permit requirements are the use of best management practices to prevent construction pollutants from contacting storm water and to keep erosion products from moving off site. During excavation, best management practices will be used to prevent construction pollutants from contacting storm water and to minimize erosional products from moving off site in accordance with SWRCB Order 99-08.

Confirmation Sampling

There are no ARARs for the confirmation sampling planned as part of the alternatives.

On-Site Disposal

Potential ARARs for the soil disposal cell include:

- California Code of Regulations, Title 27 §20080(b) (engineered alternative cover for covering the solidified and stabilized material)
- California Code of Regulations, Title 27 §20420 (post-closure groundwater detection monitoring requirements)

Although the requirements in CCR Title 27 are included, EPA does not always consider it necessary to cover soil that has undergone the solidification and stabilization process. EPA records of decision have selected remedies that use soil that has been treated with this process as backfill without the need for any cover. (See for example Macalloy Corporation August 21, 2002, Record of Decision EPA/ROD/RO4-02/084, EPA ID: SCD003360476.)

The soil disposal cell is considered to be within the area of contamination (AOC) of the site. In general, an AOC is described as an area of continuous contamination of varying amounts and types at a CERCLA site equated to a single RCRA land disposal unit where movement within

the unit does not constitute placement. Movement of hazardous waste within the AOC is not a new act of treatment, storage, or disposal under the AOC policy and therefore does not trigger RCRA land disposal restrictions. In addition, the soil is expected to be nonhazardous after the solidification and stabilization process is complete.

Land Use Controls

There are no federal ARARs for land use controls.

State statutes and regulations that the Navy has accepted as ARARs for implementing institutional controls and entering into an Environmental Restriction Covenant and Agreement with DTSC include substantive provisions of the following:

- California Civil Code § 1471 (provides conditions under which land use restrictions will apply to successive owners of land).
- California Health and Safety Code § 25202.5 (allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses).
- California Health and Safety Code § 25222.1 (provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of California Health and Safety Code § 25232(b)(1)(A)–(E)).
- California Health and Safety Code § 25234 (sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "the waste no longer creates a significant existing or potential hazard to present or future public health or safety").
- California Code of Regulations, Title § 67391.1(e)(2) (Whenever the Department determines that it is not feasible to record a land use covenant for property owned by the federal government, such as transfers from one federal agency to another, DTSC and the federal government may use other mechanisms to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances which remain on the property.)
- Habitat Restoration

There are no action-specific ARARs for habitat restoration. Habitat will be restored in accordance with the location-specific ARARs identified above.

Habitat Restoration

There are no action-specific ARARs for habitat restoration. Habitat will be restored in accordance with the location-specific ARARs identified above.

3.5 REMOVAL ACTION OBJECTIVES

RAOs are site-specific qualitative or quantitative goals that define the extent of cleanup required for a removal action. Based on CERCLA and the NCP, RAOs for the Site 30 removal action are as follows:

- Promote overall protection of human health and the environment.
- Restrict the potential for humans and other ecological receptors to contact soil contaminated by chemicals or solid waste near the ground surface within Site 30.

The following criteria are considered action levels for the excavation of waste and soil and sediment at Site 30 in this EE/CA for unrestricted use:

- Visual observations will be used to verify that soil containing solid-waste-contaminated soil is fully removed both vertically and laterally.
- Data presented in the RI (Tetra Tech 2002) indicated elevated concentrations of metals posing a risk to site receptors were collocated with elevated levels of lead (see Table 4 and Figure 8). Therefore, the maximum concentration of lead outside of the risk footprint (268 mg/kg), for which risk was not indicated to either ecological or human receptors, will be used as the action level to confirm the removal of contaminated soil.

4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Based on the objectives presented in Section 3.4, four alternatives have been developed for the removal action at Site 30. The four alternatives are described in the following sections and are evaluated based on their effectiveness, implementability, and cost. Each alternative is evaluated against five criteria to evaluate effectiveness (40 CFR Part 300.430): (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume through treatment; and (5) short-term effectiveness.

Evaluation of the implementability for each alternative considers: (1) technical feasibility, (2) administrative feasibility, and (3) commercial availability of the remedy. Public and regulatory acceptance will be evaluated in an action memorandum after the public comment period for the EE/CA.

Costs for each removal action, including direct and indirect costs, were estimated using the Remedial Action Cost Engineering and Requirements (RACER) 2004 cost estimating software (Earth Tech 2004). The cost estimate was based on estimates for direct capital costs and indirect costs (markups). Annual operations and maintenance (O&M) costs for a 30-year period were included for each of the alternatives. Direct capital costs include labor, equipment, material, and waste disposal. Indirect costs include construction management staff,

office overhead, general and administration, home office expenses, design, administrative, insurance, contingency allowances, and profit.

A present worth value has been calculated for each alternative. The present worth analysis provides a single figure that represents the amount of money that, if invested in the base year and dispersed as needed, will cover all cost associated with the alternative. The present worth calculation normalizes alternatives where operating durations differ to facilitate comparisons. All "total project durations" start at the time capital equipment is delivered to the site. It is assumed that procurement and design for all alternatives will be similar, so this estimated 6- to 8-month period was not included in any of the alternative durations.

Four alternatives are presented in this section:

- Alternative 1: No action
- Alternative 2: Monitoring
- Alternative 3: Excavation, stabilization, on-site disposal, LUCs, and habitat restoration
- Alternative 4: Excavation, off-site disposal, and habitat restoration.

Either containing the waste using a sheet pile wall or stabilizing the waste in place were also considered when the removal alternatives were developed. These two options were eliminated based on the following concerns:

1. The pickleweed habitat is extremely sensitive to changes in elevation. Simply containing the waste (by using a sheet pile wall around the waste source) will not meet the RAOs developed for the site. Instead, a 2- to 3-foot "cap" over the contaminated area would be required to prevent ecological receptors from contacting COPCs and COECs. This cap will raise the elevation of the area and reduce the amount of habitat available to the SMHM, a federally listed endangered species.

2. An in situ stabilization effort will increase the volume by 20 to 25 percent, raising the elevation of the site. This change in elevation will reduce the amount of habitat available to the SMHM.

Alternatives 3 and 4 include common components (mobilization and demobilization, pre-excavation sampling, dewatering, excavation, confirmation sampling, and habitat restoration) that are discussed once before the specific alternatives. If portions of these components vary from alternative to alternative, the variation is discussed in the analysis of each alternative. Table 5 summarizes the removal alternatives and their components.

4.1 MOBILIZATION AND DEMOBILIZATION

The relatively isolated location of the TBB Disposal Site imposes some constraints on any access, including mobilization and demobilization. The site is located between two major railroad rights-of-way, the Union Pacific and BNSF (Figure 2). The nearest at-grade crossing is located 3,200 feet east of Site 30. An existing, unimproved road runs from the grade crossing between the two sets of tracks up to within 600 feet of Site 30. The existing unimproved access road between the two sets of tracks will not be adequate for use as a haul road, so a suitable haul road must be constructed to the site. The Navy will need to consult with Union Pacific and BNSF on the temporary crossing of the rail lines and working within the rights-of-ways. It is assumed that the haul road will require at least one railroad crossing over BNSF tracks (Figure 7). Clearing and grubbing vegetation will be required for construction of the haul road. It is assumed that construction equipment could complete the clearing operation in less than 1 week; however, it is estimated that negotiations with the railroads for the necessary permits could take up to 6 months.

It will be stipulated that the road will be constructed during the summer to facilitate an efficient removal action. Once the road is completed, equipment and trucks will access a 1-acre area immediately east of the Taylor Boulevard Bridge that will serve as a truck staging area. The staging area will contain a vehicle decontamination pad and a separate area for stockpiling wastes to be profiled. Polyethylene liners will be installed in areas designated to store wet wastes, and the perimeter of the staging areas will be bermed or otherwise protected as necessary to prevent sediment-laden storm water runoff to areas beyond the project boundary. Storm water will be pumped to a temporary storage tank and disposed of appropriately. Dust suppression measures will be undertaken during the entire project.

The SMHM may exist on site before removal activities begin. It is anticipated that the Navy will consult with USFWS to help minimize the short- and long-term impacts on the SMHM. The cost estimate considers construction of a mouse-proof fence 5 feet outside the eastern extent of the excavation footprint. SMHM may be trapped and relocated outside the fence under the supervision of a biological monitor before removal activities begin. The mouse-proof fence will protect the endangered SMHM by keeping them out of the construction area and will serve as a visual boundary for excavation (Figure 9)

4.2 PRE EXCAVATION SAMPLING

Soils were analyzed for polychlorinated biphenyls (PCBs) during the supplemental RI sampling effort conducted from November 2003 through February 2004. The results of the analysis indicated that PCBs were not present within the risk footprint (Tetra Tech 2004). In the U.S. EPA's August 26, 2004, comments on a June 2004 draft final remedial investigation addendum (Tetra Tech 2004), the Navy was requested to conduct a limited pre-removal action sampling event to evaluate the extent of PCB contamination of surface sediment to adequately assess associated ecological risks and confirm the risk footprint.

Limited pre-excavation samples for PCBs will be collected to confirm the risk footprint. Five surface samples will be collected outside the perimeter of the risk footprint in areas that were not previously sampled. This limited pre-removal sampling will confirm whether the risk footprint addresses PCBs.

4.3 DEWATERING

Before excavation begins, a temporary water-filled berm will be installed around the excavation footprint using Aquabarriers. The enclosed body of water will be pumped to the outside of the berm. The barrier will minimize disturbance to the adjoining wetlands, as well as enhance excavation and confirmation sampling. As a result of the dewatering effort, it is anticipated that the excavated waste will be dry enough for disposal.

In the event that the excavated waste must be air dried before disposal, it will be hauled to a laydown area, where it will be dried by spreading the materials to dry in the sun and wind. It will be stipulated that the removal action take place during the summer to make this process more efficient. The laydown area will be constructed with the necessary engineering controls (such as dust suppression and storm water pollution prevention) to facilitate the drying process and will be within the AOC of the site.

It is anticipated that minimal water will be stored on site during the excavation process with the dewatering procedure in place. Any water collected after the site is disturbed will be tested for metals, PAHs, pesticides, and PCBs. In the event that water removed during excavation is determined to be contaminated, it will be disposed of appropriately.

4.4 EXCAVATION

Debris was generally found to coincide with locations of ecological and human health risk, so the debris is likely the source of contamination (Tetra Tech 2002). The bulk of the soil and sediment that contains elevated levels of contaminants will be removed along with the debris. Data presented in the RI (Tetra Tech 2002) indicated that the elevated concentrations of the various COPCs and COECs were collocated with elevated levels of lead. These data are summarized in Table 4 and Figure 8. Based on the summarized data, it was therefore concluded that if elevated levels of debris and lead-contaminated soil are removed (confirmed by confirmation sampling), then elevated concentrations of other contaminants will also be removed from Site 30. The goals of the excavation effort are to remove all visible debris within the excavation footprint and meet the requirements for risk reduction.

The proposed footprint for the excavation is presented in Figures 6 and 9. This footprint was developed based on the risk footprint (Figure 6) developed during the RI and encompasses both the risk and debris footprints. The excavation footprint was developed using information in the RI report (Tetra Tech 2002). The approximate depth of excavation, which is also shown on Figure 9, varies from 1 to 4 feet bgs. The depths of excavation were established by evaluating the depth of debris in the boring locations where there was ecological risk and evaluating chemical concentrations in locations of human health risk. Chemical concentrations above the human health cleanup goals (Table 3) occurred mainly from the ground surface to

0.5 foot bgs (Tetra Tech 2002). Soils and sediments in locations where deeper samples were collected (between 1.0 and 1.5 feet bgs) did not exhibit an unacceptable risk to human health.

A sampling grid will be developed before excavation starts (Figure 9) to guide confirmation sampling during the excavation. Visual screening will be used to guide excavation until all visible debris has been removed within the designated grid. A confirmation soil sample will then be collected, as outlined in Section 4.5. If the requirements outlined in Section 4.5 are met, then that portion of the excavation is considered complete. If those requirements are not met, then the area will be excavated an additional foot laterally or vertically, depending on the sample location. Another confirmation sample will be collected, and the process will be repeated until the cleanup level of 268 mg/kg is reached.

Assuming a bulking factor of 30 percent, between 2,900 cubic yards (yd^3) (following the depths of the risk footprint) and 4,300 yd^3 (assuming a 3-foot uniform excavation depth and a 30 percent bulking factor) of debris and soil is anticipated to be excavated from the site. It is assumed that a low-ground-pressure excavator and a front-end loader could complete the excavation in about 1 month. Preconstruction activities such as dewatering and pre-excavation sampling can require 1 to 2 weeks to accomplish before excavation begins. Personnel will excavate the site in Level D personal protective equipment

4.5 CONFIRMATION SAMPLING PROGRAM

The confirmation sampling procedure is designed to meet the RAOs developed for the project. Confirmation soil samples will be collected during the excavation procedure from the limits of excavation and will be analyzed for lead to document any residual contamination at Site 30. Lead is the primary inorganic chemical of concern. Other COPCs and COECs appear to be collocated with the lead contamination (Table 4 and Figure 8). Based on the results from previous sampling, it is apparent that removing the lead-contaminated soil will also remove the elevated concentrations of all other COPCs and COECs. The highest detection of lead outside the limits of the proposed excavation (268 mg/kg) will be used as the clean up value for lead. The confirmation samples will be collected from the bottom (26 samples, 35 feet center to center) and sidewalls (24 samples, 35 feet center to center) of the excavation and will be analyzed for lead (Figure 9). A 3-day turnaround time is assumed for analysis of lead. Analytical results will be compared with the 268 mg/kg cleanup level for lead (Tables 3 and 4). The analytical results will be used to evaluate the status of the removal action, as described above. If confirmation sampling results indicate that contamination remains at the site, then the removal action in the area affected will be expanded as outlined in Section 4.4 until the RAOs are achieved.

This cost estimate assumed that 50 confirmation samples will be collected from the walls and base of the excavation and analyzed for lead (Figure 9). Quality assurance and quality control (QA/QC) samples will be also collected.

4.6 SITE RECONSTRUCTION WITH IMPORTED FILL AND HABITAT RESTORATION

Once confirmation sampling results indicate that excavation is complete, Site 30 will be reconstructed by backfilling the excavation with imported fill material that is suitable for re-establishing aquatic habitat and enhancing the wetland and upland habitats. The source and availability of suitable import material that would meet Water Board criteria for wetland cover soils has not yet been identified.

Excavated areas will be backfilled and graded to re-establish the existing contours and elevations in the pickleweed zone to the extent practicable. The final site grade will be designed to encourage growth of pickleweed in the areas east of and adjacent to the existing zone. Farther east of the new pickleweed area, the site will be graded to match the existing upland contours and elevations. Figure 10 presents a conceptual grading plan, and Figure 11 presents a cross-section that shows the proposed limits of excavation and site reconstruction.

Backfill will be soil that is compatible with the wetland that is imported from either an on-site borrow pit or an off-site source. Based on the specification for wetland compatible soils developed for the landfill at Site 1 at NWS SBD Concord, the source will meet the following requirements:

- pH = 5.0 to 8.0
- Cation exchange capacity = > 15 milliequivalent per 100 grams
- Organic matter = >5 percent
- Ca, Mg, Na = Sodium Adsorption Ratio (SAR) <12
- Potassium (K) = > 200 parts per million (ppm)
- Percent base saturation greater than 50 percent
- Kjeldahl nitrogen (total nitrogen) = > 2 percent (20,000 ppm)
- Nitrate-nitrogen = 50 to 100 ppm

The material will be tested to confirm that it is suitable. The final lift will overfill above design grade and will be compacted to 80 percent proctor density. Erosion control and re-vegetation procedures will be developed to facilitate seedling growth and reestablishment of vegetation.

The vegetation will be restored using existing pickleweed plants, along with plants from an off-site nursery. Existing plants, to the extent possible, will be removed and stored during excavation and will be reused during restoration.

4.7 ALTERNATIVE 1 – NO ACTION

Under Alternative 1, no action will be taken. Contaminated soil, sediments, and debris will be left at Site 30 "as is." The no action response is retained throughout the EE/CA process as required by the NCP (40 CFR 300.430[e][6]) to provide a comparative baseline used to evaluate other alternatives. Table 5 summarizes the removal alternatives and their components.

4.7.1 Effectiveness

This alternative is evaluated for the five effectiveness criteria in the following paragraphs.

4.7.1.1 Overall Protection of Human Health and the Environment

The no action alternative is not protective of human health or the environment under the unrestricted (or residential) use scenario because this alternative does nothing to prevent unrestricted use or address contaminants in soil, sediments, and debris that could pose a potential risk to human and ecological health. Contaminated soil, sediments, and debris will be left as is. Therefore, this alternative will not eliminate, reduce, or control the potential human health and ecological risk presented by contaminated soil and sediments at Site 30.

The alternative is also not protective of ecological receptors because it does nothing to prevent direct or indirect contact of ecological receptors with the COECs identified.

4.7.1.2 Compliance with ARARs/TBC Guidance

This alternative does not comply with ARARs.

4.7.1.3 Long-Term Effectiveness and Permanence

The factors evaluated under long-term effectiveness and permanence include the magnitude of residual risk and the adequacy and reliability of controls. Risks to human health and ecological receptors will be unacceptable because of the presence of COPCs and COECs in soils, sediments, and debris. Thus, Alternative 1 does not assure long-term effectiveness and permanence.

4.7.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

The mobility, toxicity, and volume of hazardous substances at Site 30 will not be reduced under Alternative 1 because the contaminated soil, sediments, and debris will not be removed or treated.

4.7.1.5 Short-Term Effectiveness

The factors considered when assessing the short-term effectiveness of an alternative are protection of the community and workers during the action, environmental impacts that would result from construction and implementation of the alternative, and the time required to complete the removal action. Each of these factors is assessed below for Alternative 1.

This alternative does nothing to address the unacceptable health risks to the community and current occupants because no removal action will be taken. No adverse environmental impacts will result from construction and implementation of this alternative because no removal action will be taken. This alternative does not require any time for removal action because no removal action will be conducted.

Alternative 1 will not achieve the RAO for soils under the unrestricted land use scenario or the ecological RAOs. The no action alternative is therefore considered not effective in the short term.

4.7.2 Implementability

Implementability includes the technical and administrative feasibility and availability of required resources. No construction or administrative actions will be required to implement this alternative. Therefore, the alternative is technically feasible and would be easily implemented.

4.7.3 Cost

There is no cost to implement this alternative.

4.8 ALTERNATIVE 2 – MONITORING

Under Alternative 2, no removal action will be taken. Contaminated soil, sediments, and debris will be left at Site 30 "as is." Under this alternative, annual monitoring will be instituted to evaluate the health of plant and animal populations. A field survey of the plant population will be conducted annually by a qualified biologist. Groundwater samples will be collected yearly to analyze for metals, PAHs, and PCBs to evaluate potential migration of COPCs and COECs off site. Table 5 summarizes the removal alternatives and their components.

4.8.1 Effectiveness

This alternative is evaluated for the five effectiveness criteria in the following paragraphs.

4.8.1.1 Overall Protection of Human Health and the Environment

This alternative is not protective of human health or the environment under the unrestricted (or residential) land use scenario because this alternative does nothing to prevent unrestricted use or to address contaminants in soil, sediments, and debris that could pose a potential risk to human and ecological health. Contaminated soil, sediments, and debris will be left as is. Monitoring will serve only to evaluate migration of contaminants off site and to indicate whether contaminants at Site 30 are bioaccumulating within the ecological receptors. Therefore, this alternative will not eliminate, reduce, or control the potential human health and ecological risk presented by contaminated soil and sediments at Site 30.

The alternative is also not protective of ecological receptors because it does nothing to prevent direct or indirect contact of ecological receptors with the identified COECs.

4.8.1.2 Compliance with ARARs/TBC Guidance

This alternative does not comply with ARARs.

4.8.1.3 Long-Term Effectiveness and Permanence

The factors evaluated under long-term effectiveness and permanence include the magnitude of residual risk and the adequacy and reliability of controls. Risks to human health and ecological receptors will be unacceptable because of the presence of COPCs and COECs in soils, sediments, and debris. Thus, Alternative 2 does not assure long-term effectiveness and permanence.

4.8.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

The mobility, toxicity, and volume of hazardous substances at Site 30 will not be reduced under Alternative 2 because contaminated soil, sediments, and debris will not be removed or treated.

4.8.1.5 Short-Term Effectiveness

The factors considered when assessing the short-term effectiveness of an alternative are protection of the community and workers during the action, the environmental impacts that would result from construction and implementation of the alternative, and the time required to complete the removal action. Each of these factors is assessed below for Alternative 2.

This alternative does nothing to address the unacceptable health risks to the community and current occupants because no removal action will be taken. No adverse environmental impacts will result from construction and implementation of this alternative because no removal action will be taken. This alternative does not require any time for a removal action because no removal action will be conducted.

Alternative 2 will not achieve the RAO for soils under the unrestricted land use scenario or the ecological RAOs. Alternative 2 is therefore considered not effective in the short term.

4.8.2 Implementability

Implementability includes the technical and administrative feasibility and availability of required resources. No construction or administrative actions will be required to implement this alternative. A qualified biologist or environmental scientist will monitor the site (including plant and animal surveys, tissue collection, and groundwater sampling) annually. Therefore, the alternative is technically feasible and would be easily implemented.

4.8.3 Cost

Total estimated cost to complete this alternative is $382,000. The detailed cost estimate associated with this alternative is presented in Appendix B. This cost estimate includes costs for annual surveying of plants and animals by a qualified biologist, groundwater sampling and laboratory analysis, and annual monitoring reports to summarize the findings over a 30-year period.

4.9 ALTERNATIVE 3 – EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LUCS, AND HABITAT RESTORATION

Alternative 3 consists of excavating between 2,900 and 4,300 yd^3 of debris and soils that contain contaminants at concentrations that pose a risk to human and ecological health. The depth and footprint of the excavation were delineated as part of the alternative development process (Figure 9). Excavated material will be stabilized and disposed of in an on-site soil cell adjacent to Site 30 (Figure 12). Risks to human and ecological receptors from exposure to contaminated soils and sediments by direct and indirect contact will be mitigated under this alternative because all contaminated soil, sediments, and debris will be removed, stabilized, and contained. Table 5 summarizes the removal action alternatives and their components.

The major components of this alternative are as follows:

- Mobilization and demobilization of earth-moving equipment.
- Installation of species control systems, and trapping and relocation as necessary.
- Installation of water control systems and dewatering as necessary.
- Excavation of disposal cell.
- Installation of disposal cell monitoring wells.
- Mechanical excavation of contaminated soil, sediments, and debris according to the confirmed excavation footprint and confirmation sampling.
- Screening and stabilization of excavated waste.

- On-site containment of stabilized waste
- Reconstruction of the excavated areas with imported material that is suitable for an aquatic habitat and growth of pickleweed.
- Groundwater monitoring downgradient of the disposal cell.
- Land use controls to protect the completed action.

The mobilization and demobilization, excavation, confirmation sampling and habitat restoration processes are as described in Sections 4.1 through 4.3.

Solidification/stabilization (S/S) is a physical and chemical treatment process that reduces mobility either by chemically altering or binding the contaminant (stabilization) or by reducing contaminant contact with a mobilizing medium by enclosing it within a stabilized mass (solidification). Inorganic and organic reagents are mixed with the target medium to achieve S/S. Example reagents include lime, fly ash, Portland cement, bitumen, polyethylene, and reactive monomers.

Stabilization is considered a treatment technology and is effective for metals. The metals ions will be chemically bound in a pozzolanic matrix, and the final material will no longer be characteristically hazardous. The success of solidification/stabilization methods depend on soil type and properties, contaminant type and concentrations, moisture content, organic content, density, permeability, unconfined compressive strength, leachability, pH, and particle size.

An important design consideration is identifying a stabilizing agent that is compatible with the waste and that yields a treated product that meets minimum compressive strength and that does not leach contaminants or produce free liquids during processing. Furthermore, the effectiveness of ex situ S/S depends on effective mixing. Before excavation and stabilization can begin, bench-scale tests will be needed on the debris and sediment to establish the required reagents and mixing ratios for the S/S process. Based on the results from the RI (Tetra Tech 2002), it is assumed that material at Site 30 is a good candidate for the solidification/stabilization process. Pilot studies may be required to establish the most effective mixing technology, however.

A soil disposal cell will be constructed in a location adjacent to and east of the disposal site. If groundwater is encountered during the excavation, dewatering techniques similar to those described in Section 4.3 would be implemented. The soil disposal cell would be constructed by excavating an area of 16,000 square feet (10 feet deep), which would be able to hold a volume of 6,000 cubic yards. The sizing of the cell factors in the increase in volume of the excavated waste caused by the addition of cement and other substances during the stabilization process, along with the additional volume required to install a cover over the stabilized waste. The excavated soil from the cell site would be temporarily stockpiled for later reuse. This soil would be characterized for suitability as restoration material for the excavated wetland. The suggested analytical suite includes metals, semivolatile organic compounds (SVOCs), total organic carbon (TOC), and particle size distribution. The top 2 feet would be used to construct the disposal cell cover, and the deeper soils would be used to restore Site 30, provided they meet the suitability requirements for wetland backfill.

The soil disposal cell would be constructed in accordance with the action-specific ARARs established for this alternative. Construction for the disposal cell would include excavation, leveling, placing stabilized waste material in the cell, installing the disposal cell cover, and installing an additional well downgradient from the disposal cell. Excavation would include dewatering. Leveling would provide a smooth surface where stabilized waste could be held.

The conceptual design of the disposal cell cover is based on an engineered alternative cover (Figure 12). Conceptually the disposal cell cover will consist of a foundation layer, compacted soil layer, and topsoil/vegetation layer. This cover will minimize liquid penetrations into the closed disposal cell over the long term; promote drainage and minimize erosion or abrasion of the cover; accommodate settling and subsidence to maintain the cover's integrity; discourage intrusion by humans, animals and plants and minimize maintenance requirements.

After the stabilized material is placed in the disposal cell, a foundation layer will be placed on top of it. The foundation layer will consist of six inches of previously excavated clean soil. This layer will be compacted on top of the stabilized material. The foundation layer will provide a smooth surface for the overlying compacted soil cover.

Then a layer consisting of eighteen inches of compacted soil cover will be laid down. This compacted soil layer will provide a root base for the overlying topsoil/vegetation layer and will protect the underlying liners from damage due to movement of vehicles on the site.

The final layer of the disposal cell cover is the topsoil/vegetation layer. This six inch layer will reduce erosion and infiltration of rainwater and provide protection to the underlying cap from water and wind erosion. Onsite excavated soil deemed uncontaminated will be used as fill and native vegetative cover will be planted.

After cell closure, surveillance, maintenance, and long-term annual groundwater monitoring would be continued to ensure the performance of the disposal cell. LUCs would be implemented that would address collection and treatment of shallow groundwater in the event that compliance limits are triggered. Physical and administrative restrictions on access and use would also be imposed. Deed restrictions would prohibit construction or drilling that may damage the disposal cell cover. Prohibitions on land use would be initiated and maintained by Navy institutional controls. Periodic 5-year reviews would be conducted to evaluate and document the effectiveness of the remedy.

4.9.1 Effectiveness

This alternative is evaluated for the five effectiveness criteria in the following paragraphs.

4.9.1.1 Overall Protection of Human Health and the Environment

The RAO for unrestricted land use is concerned primarily with preventing exposure to contaminated soil. Alternative 3 is protective of human health by reducing the exposure of COPCs through removal and containment of soils and sediments and debris. Land-use restrictions would be required for the on-site disposal cell.

RAOs for ecological receptors are concerned with source control and preventing exposure to metals in contaminated soil, pore water, and food. Alternative 3 is protective of ecological receptors by removing source material (debris) and reducing exposure of ecological receptors to COECs in the most biologically active soil layer (0 to 3 feet bgs), reducing its toxicity and mobility and containing it in an engineered containment system. On-site disposal would be designed such that no new exposure pathways to the debris are created. Protection of the four ecological receptor categories would likewise protect the biota in all three habitats at the site because these receptors constitute appropriate surrogates for communities and trophic levels in habitats at Site 30.

4.9.1.2 Compliance with ARARs/TBC Guidance

Alternative 3 can be designed to meet all chemical-, location-, and action-specific ARARs, which are summarized in Section 3.4 and in Tables A-1, A-2, and A-3 in Appendix A.

Potential ARARs for the construction of the soil disposal cell include:

- California Code of Regulations, Title 27 §20080(b) (engineered alternative cover for covering the solidified and stabilized material)
- California Code of Regulations, Title 27 §20420 (post-closure groundwater detection monitoring requirements)

Although the requirements in CCR Title 27 are included, EPA does not always consider it necessary to cover soil that has undergone the solidification and stabilization process. EPA records of decision have selected remedies that use soil that has been treated with this process as backfill without the need for any cover. (See for example Macalloy Corporation August 21, 2002 Record of Decision EPA/ROD/RO4-02/084, EPA ID: SCD003360476.)

As noted previously, the action does not trigger land disposal restrictions and would render the soil characteristically nonhazardous. Hazardous waste disposal ARARs therefore do not apply.

The substantive requirements in BAAQMD Regulation 6 are considered applicable to Alternative 3. Specifically, Regulations 6-302, and 6-305, which specify standards for particulates and visible emissions, would be applicable to limit dust and particulate emissions during excavation and removal. Dust control would likely include judicious use of water and palliatives, properly covering stockpiled soils, modifying operations, or other engineering means acceptable to the Navy and regulatory agencies.

Alternative 3 would also comply with the applicable storm water discharge requirements of SWRCB Order 99-08 adopted pursuant to 40 CFR Part 122, Subpart C.

Alternative 3 would comply with all location-specific ARARs, including the Coastal Zone Management Act and the Federal Endangered Species Act. Excavation and disposal of affected soils would eliminate potential exposure pathways for both human and ecological receptors.

The SMHM is a federally listed endangered species that could occur at the TBB Disposal Site. Activities at the site under Alternative 3 could therefore result in unlawful take, as defined under the Endangered Species Act. The Navy will survey for the presence or absence of the SMHM to determine if coordination with the USFWS is necessary. If SMHM are present on the site, the Navy will coordinate with the USFWS and obtain USFWS concurrence that the removal action is protective of the SMHM.

Restoration of the excavated area proposed under Alternative 3 would involve excavation and filling in a wetland. Based on a review of the information in the RI, this EE/CA concludes that Site 30 is potentially a jurisdictional wetland as defined under the Clean Water Act. The Navy would therefore comply with the substantive requirements of the nationwide permit and 40 CFR Sections 230.10 and EO 11990 (protection of wetlands). The Navy would also comply with EO 11988 (floodplain management). In addition, Alternative 3 would comply with the following state location-specific ARARs:

- California Fish and Game Code §§ 5650(a), (b) & (f); 3005; 1908; 2080; 3511; 4700, 5050, 3503; 3503.5; 3800; 4000; 4150; and 8500.
- California Fish and Game Commission Wetlands Policy: This policy seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California.
- California Code of Regulations, Title 14 §§ 472; 40; 460; and 465.

There are no federal ARARs for land use controls. Alternative 3 will comply with the following requirements which have been identified as state ARARs for land use controls:

- California Civil Code § 1471 (provides conditions under which land use restrictions will apply to successive owners of land).
- California Health & Safety Code § 25202.5 (allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses).
- California Health & Safety Code § 25222.1 (provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of California Health & Safety Code § 25232(b)(1)(A)–(E)).

- California Health & Safety Code § 25234 (sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety").
- California Code of Regulations, Title § 67391.1(e)(2)) (Whenever the Department determines that it is not feasible to record a land use covenant for property owned by the federal government, such as transfers from one federal agency to another, DTSC and the federal government may use other mechanisms to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances which remain on the property.)

There are no ARARs for habitat restoration. Habitat would be restored in accordance with the location-specific ARARs identified above.

4.9.1.3 Long-Term Effectiveness and Permanence

The factors evaluated under long-term effectiveness and permanence include (1) the magnitude of residual risk, and (2) the adequacy and reliability of controls. Each of these factors is assessed below for Alternative 3

Magnitude of Residual Risks

Residual risks may be permanently reduced to within acceptable levels that are protective of human health and the environment by removing all affected soils and sediments that contain contaminants at concentrations that exceed the cleanup criteria for lead, and by removing all debris within Site 30. Stabilization would reduce the mobility and toxicity of the waste. Land use controls would be imposed to control access to the on-site disposal area, and applicable standards and guidelines would be met in the short run.

Adequacy and Reliability of Controls

There is a low potential for the on-site disposal facility to cause adverse impacts to the environment. In addition, environmental conditions may affect long-term mobility of the contaminants. Furthermore, chemical stabilization processes may consume large volumes of bulk reagents and additives. Finally, land use controls would be required to limit development at the on-site soil disposal cell. Technology performance specifications, long-term management, monitoring, and O&M may be required under this alternative to ensure the effectiveness of the remedy. Therefore, Alternative 3 is considered moderately to highly effective and reliable over the long term.

4.9.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

This evaluation criterion addresses the CERCLA preference for selecting removal actions that employ treatment technologies that permanently and significantly reduce the mobility, toxicity, or volume of hazardous substances. Alternative 3 would not reduce the volume, but would

reduce the toxicity and mobility, of hazardous substances at the site. Alternative 3 would be moderately effective in satisfying this criterion since it effectively immobilizes and reduces the toxicity of the waste.

4.9.1.5 Short-Term Effectiveness

The factors considered when assessing the short-term effectiveness of an alternative are protection of the community and workers during removal actions, environmental impacts that could result from construction and implementation of the alternative, and time required to complete removal actions. Each of these factors is assessed in the following paragraphs for Alternative 3

Protection of the Community

Access to the site is restricted from a distance of at least 2 to 3 miles from Site 30. The public is not likely to face any short-term risks during excavation and removal. However, measures would be taken during excavation, staging, loading, stabilization, and disposal of contaminated soil, sediments, and debris to reduce and control short-term risks.

Dust suppression measures would be used, as necessary, to reduce generation of fugitive dusts and to be compliant with Occupational Safety and Health Administration (OSHA) safety standards. A detailed air monitoring plan would be developed that would establish specific boundaries for work areas and traffic routes. Strategic locations along these boundaries would be monitored for airborne emissions to ensure that health-protective levels are achieved in the short term throughout the removal action.

Worker safety considerations associated with implementation of Alternative 3 can be grouped into two categories: (1) general site hazards, and (2) potential chemical hazards. General site hazards include the following:

- Heavy equipment hazards
- Occupational noise exposure
- Potential slip, trip, or fall hazards
- Potential for contact with overhead mechanical and electrical hazards or utility lines
- Airborne dust hazards

Exposure to general site hazards can be reduced by providing (1) appropriate safety equipment to minimize noise and dust exposure, and (2) awareness training to orient personnel with physical hazards at a site.

Potential chemical hazards include inhalation of, absorption of, ingestion of, and contact with hazardous substances in contaminated soil. Because this is work at a hazardous waste site, work would be performed in accordance with the OSHA Safety Requirements for Hazardous Waste

Operations and Emergency Response (HAZWOPER) found at 29 CFR 1910. It is anticipated that on-site workers would wear Level D protection during excavation. The specific protection worn would be dictated by the level of dermal and inhalation protection necessary. Air would be monitored to assist in setting the required level of protection. The level of protection may be upgraded if high contaminant concentrations are detected during excavation of soil, sediments, and debris at Site 30.

Environmental Impact

Excavation would result in short-term, temporary impacts to environment. Upland impacts would include vegetation affected by equipment traffic from the access point to the working area and within the staging area adjacent to the excavation. These impacts should be minimal and would be mitigated by using post-construction restorative efforts or by using low ground pressure (LGP) equipment as necessary. Additionally, crane mats may be used where soft ground is present.

Non-mobile animals and a portion of the plants within the area enclosed by a temporary water-filled dam could be temporarily lost as a result of dewatering during the project. Any affected biota is expected to recolonize the unexcavated area after the dam is removed, however. In addition, the temporary dam would minimize any impacts to Seal Creek Marsh.

Impacts from excavation would include removal of all non-mobile biota in the excavation area. The excavation area would be reconstructed and restored so that no permanent impacts would occur. Final contours in a portion of the upland transition area adjacent to the shore would be lowered to provide additional and enhance the habitat.

Air monitoring would ensure that dust control measures are effectively limiting environmental impacts. In addition, appropriate equipment decontamination procedures would be used to prevent transport of contaminated soil, sediments, and debris to uncontaminated areas of Site 30. The removal action would be constructed in a manner to reduce potential impacts to biota in the adjacent areas.

Time Required for Removal Action

Approximately 2 months would be required to complete the removal activities associated with Alternative 3. The length of time required to excavate, stabilize, and dispose of stabilized debris and soils may be affected by the following factors:

- The time required to dewater the excavation.
- The time required to characterize samples of the contaminated soil.
- Additional volumes of debris encountered during excavation.
- The number of unanticipated obstructions during excavation.

- Suitable weather conditions.
- Access limitations imposed by the railroad to accommodate its operation.

Based on the five criteria above, Alternative 3 is considered to have an overall moderate level of short-term effectiveness.

4.9.2 Implementability

The technical and administrative feasibility, and availability of required resources to implement Alternative 3 are discussed below.

4.9.2.1 Technical Feasibility

Alternative 3 is considered to involve medium to high technical complexity, primarily because access to Site 30 is limited. Obtaining permission for construction near the railway easements, as well as mobilizing earth-moving equipment, would be the greatest challenges. The Navy must consult the BNSF and Union Pacific about potential crossing of the rail lines and working within the rights-of-way. These constraints could delay the construction schedule 3 to 6 months.

This alternative would use standard construction methods. Some added regulatory constraints would be encountered because Site 30 is a wetland, however. After site reconstruction, annual monitoring may be necessary to document that wetland habitat has been re-established and to monitor groundwater downgradient of the disposal cell.

4.9.2.2 Administrative Feasibility

The alternative is administratively feasible. However, coordination with multiple regulatory agencies would be necessary to comply with action-specific ARARs.

4.9.2.3 Availability of Required Resources

The on-site disposal capacity would be adequate to manage the relatively small volume of stabilized soils and sediments (approximately 4,300 yd^3) generated from Site 30. Resources required to complete associated removal activities are available.

Overall, Alternative 3 is considered to be moderately implementable based on the technical and administrative challenges associated with this alternative.

4.9.3 Cost

The overall cost of this alternative is considered moderate to high because of capital costs associated soil excavation, stabilization, and on-site disposal. The cost of constructing an on-site soil disposal cell depends on the soil characterization. Capital costs for this alternative assume that (1) the existing unimproved road that runs between the existing railroad tracks can be improved for

use as a haul and access route to Site 30; (2) a haul route to Site 30 is not located within a habitat for any threatened or endangered species; (3) no federal jurisdictional issues are related to the haul route locations; and (4) there is no agreement in place between the Navy and regulatory agencies related to habitat issues. O&M costs associated with this alternative include annual monitoring for 1 to 3 years to document that wetland habitat is restored and to monitor groundwater downgradient of the disposal cell.

The total estimated cost to complete this alternative is $2.1 million. A detailed breakdown of the estimated costs is presented in Appendix B.

4.10 ALTERNATIVE 4 – EXCAVATION, OFF-SITE DISPOSAL, AND HABITAT RESTORATION

Alternative 4 consists of excavating between 2,900 and 4,300 yd^3 of debris and soils that contain contaminants at concentrations that pose a risk to human and ecological health. The depth and footprint of the excavation were delineated as part of the alternative development process (Figure 9). Excavated soils would be disposed of off site (Figure 13). Risks to human and ecological receptors from exposure to contaminated soils and sediments by direct and indirect contact would be eliminated under this alternative because all contaminated soil, sediments, and debris would be removed. Table 5 summarizes the removal alternatives and their components.

The major components of this alternative are as follows:

- Mobilization and demobilization of earth-moving equipment.
- Installation of species control systems and trapping as necessary.
- Installation of water control systems and dewatering as necessary.
- Mechanical excavation of contaminated soil, sediments, and debris according to the confirmed excavation footprint and confirmation sampling.
- Off-site disposal of contaminated soil, sediments, and debris at appropriate landfills.
- Reconstruction of the excavated areas with imported material that is suitable for an aquatic habitat and pickleweed.

The mobilization and demobilization, excavation, confirmation sampling, and habitat restoration processes are as described in Sections 4.1 through 4.4.

Excavated soil, sediments, and debris would be hauled to appropriate off-site landfills via trucks. However, based on existing data for metals, it is likely that the excavated material would be hauled to a Class I (hazardous waste) landfill. Therefore, this EE/CA assumes that 70 percent of the waste would be disposed of in a Class I facility and 30 percent in a Class II facility. The current analytical results are not adequate to identify the disposal facility or the land disposal treatment requirements.

4.10.1 Effectiveness

This alternative is evaluated for the five effectiveness criteria in the following paragraphs.

4.10.1.1 Overall Protection of Human Health and the Environment

The RAO for unrestricted land use is concerned primarily with preventing exposure to contaminated soil. Alternative 4 is protective of human health by reducing the exposure to COPCs by removing contaminated soils, sediments, and debris.

RAOs for ecological receptors are concerned with source control and preventing exposure to metals in contaminated soil, pore water, and food. Alternative 4 is protective of ecological receptors by removing source material (debris) and reducing exposure of ecological receptors to COECs by removing contaminated soils and sediments in the most biologically active soil layer (0 to 3 feet bgs). Protection of the four ecological receptor categories would likewise protect the biota in all three habitats at the site because these receptors constitute appropriate surrogates for communities and trophic levels in habitats at Site 30.

4.10.1.2 Compliance with ARARs/TBC Guidance

Alternative 4 can be designed to meet all chemical-, location-, and action-specific ARARs, which are summarized in Section 3.4 and in Tables A-1, A-2, and A-3 in Appendix A. Excavation and disposal could trigger a variety of hazardous waste requirements under RCRA. Since there is a reasonable expectation that the excavated soil would be hazardous, analysis of the excavated soil samples would be recommended unless sufficient data are obtained during pre-excavation sampling for analysis by the toxicity characteristic leaching procedure (TCLP). Sampling must comply with the hazardous waste identification regulations in 22 CCR, Division 4.5, Chapter 11 and 14, to assess whether the soil exhibits state or federal hazardous waste characteristics. Alternative 4 would comply with the RCRA hazardous waste classification and determination requirements.

If the soil qualifies as a hazardous waste, it would be managed, stored, and transported in accordance with the substantive federal requirements in 49 CFR Sections 171.2(f), 171.2(g), 172.300, 172.301,172.302, 172.303172.304, 172.312, 172.400, and 172.504, as well as the RCRA requirements in 22 CCR, Sections 66262.20 through 66262.23 and Sections 66262.30 through 66262.34 (Table 2-5). If the federal requirements have been revised, disposal of soils would be governed by the most recent federal requirements.

As appropriate, excavated soil would be handled and treated to comply with the land disposal restrictions (LDRs) at 22 CCR 66268.7. In addition, if the soil is not hazardous waste, it would be characterized according to the requirements of CCR Title 27 for solid and designated waste to evaluate whether the material must be disposed of at a permitted Class II or Class III landfill.

Furthermore, the substantive requirements in BAAQMD Regulation 6 are considered applicable to Alternative 4. Specifically, Regulations 6-302, and 6-305, which specify standards for particulates and visible emissions, would be applicable to limit dust and particulate emissions during excavation and removal. Dust control would likely include judicious use of water and palliatives, properly covering stockpiled soils, modifying operations, or other engineering means acceptable to the Navy and regulatory agencies.

Alternative 4 would also comply with the applicable storm water discharge requirements of SWRCB Order 99-08 adopted pursuant to 40 CFR Part 122, Subpart C.

Alternative 4 would comply with all location-specific ARARs, including the Coastal Zone Management Act and the Federal Endangered Species Act. Excavation and removal of affected soils would eliminate potential exposure pathways for both human and ecological receptors.

The SMHM is a federally listed endangered species that could occur at the TBB Disposal Site. Activities at the site under Alternative 4 could therefore result in unlawful take, as defined under the Endangered Species Act. The Navy will survey for the presence or absence of the SMHM to determine if coordination with the USFWS is necessary. If SMHM are present on the site, the Navy will coordinate with the USFWS and obtain USFWS concurrence that the removal action is protective of the SMHM.

Restoration of the excavated area proposed under Alternative 4 would involve excavation and filling in a wetland. Based on a review of the information in the RI, this EE/CA concludes that Site 30 is potentially a jurisdictional wetland as defined under the Clean Water Act. The Navy would therefore comply with the substantive requirements of the nationwide permit and 40 CFR Sections 230.10 and EO 11990 (protection of wetlands). The Navy would also comply with EO 11988 (floodplain management). In addition, Alternative 4 would comply with the following state location-specific ARARs:

- California Fish and Game Code §§ 5650(a), (b) & (f); 3005; 1908; 2080; 3511; 4700, 5050, 3503; 3503.5; 3800; 4000; 4150; and 8500.
- California Fish and Game Commission Wetlands Policy: This policy seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California.
- California Code of Regulations, Title 14 §§ 472; 40; 460; and 465.

4.10.1.3 Long-Term Effectiveness and Permanence

The factors evaluated under long-term effectiveness and permanence include (1) the magnitude of residual risk, and (2) the adequacy and reliability of controls. Each of these factors is assessed below for Alternative 4

Magnitude of Residual Risks

Residual risks would be permanently reduced to within acceptable levels that are protective of human health and the environment by removing all affected soils and sediments that contain contaminants at concentrations that exceed the cleanup criteria for lead, and by removing all debris.

Adequacy and Reliability of Controls

Excavation with off-site disposal is a proven and reliable technology that would effectively remove contaminated soils from Site 30 and thus permanently reduce the possibility of human or ecological exposure to affected materials. Annual monitoring for 1 to 3 years may be required to document that the wetland habitat at Site 30 has been successfully revegetated. Therefore, Alternative 4 is considered highly effective over the long term.

4.10.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

This evaluation criterion addresses the CERCLA preference for selecting removal actions that employ treatment technologies that permanently and significantly reduce the mobility, toxicity, or volume of hazardous substances. Depending on results of waste characterization, treatment may be required before the material can be landfilled if it is characterized as hazardous waste. If the material is treated, the CERCLA preference for treatment, as a principal element of the remedy, would be satisfied by Alternative 4. However, since the current analytical results are not adequate to identify the disposal facility or the land disposal treatment requirements, conservative assumptions were made regarding the costs of diposal and requisite treatment. It has been assumed in this EE/CA that 4,622 tons of material would be excavated and that 70 percent of that waste would be disposed of in a Class I facility and 30 percent in a Class II facility. It is further assumed that the hazardous waste sent to the Class I facility would require treatment at the facility before it can be landfilled. Based on these assumptions, Alternative 4 would substantially reduce the toxicity and mobility of the hazardous substances, but not the volume. Thus, overall excavation and disposal would be moderately effective in satisfying this criterion.

4.10.1.5 Short-Term Effectiveness

The factors considered in assessing the short-term effectiveness of an alternative are protection of the community and workers during removal actions, environmental impacts that could result from construction and implementation of the alternative, and time required to complete removal actions. Each of these factors is assessed in the following paragraphs for Alternative 4.

Protection of the Community

Access to the site is restricted from a distance of at least 2 to 3 miles from Site 30. The public is not likely to face any short-term risks during excavation and removal. However, measures would be taken during excavating, staging, loading, stabilizing, and disposing of contaminated soil, sediments, and debris to reduce and control short-term risks.

For example, dust suppression measures (that is, watering, covering waste-filled trucks) would be used, if necessary, to reduce generation of fugitive dusts, although excavated material is expected to be wet or moist. A detailed air monitoring plan would be developed that would establish specific boundaries for work areas and traffic routes. Strategic locations along these boundaries would be monitored for airborne emissions to ensure levels that are health-protective in the short term are achieved throughout the removal action. The local community may also be faced with increased truck traffic during excavation and backfilling; however, the increased number of trucks is not expected to result in noticeable traffic or other impacts.

Worker safety considerations associated with implementation of Alternative 4 can be grouped into two categories: (1) general site hazards, and (2) potential chemical hazards. General site hazards include the following:

- Heavy equipment hazards
- Occupational noise exposure
- Potential slip, trip, or fall hazards
- Potential for contact with overhead mechanical and electrical hazards or utility lines
- Airborne dust hazards

Exposure to general site hazards can be reduced by providing (1) appropriate safety equipment to minimize noise and dust exposure, and (2) awareness training to orient personnel with physical hazards at a site.

Potential chemical hazards include inhalation of, absorption of, ingestion of, and contact with hazardous substances in contaminated soil. It is anticipated that on-site workers would wear Level D protection during excavation of soil. The specific protection worn would be dictated by the level of dermal and inhalation protection necessary. Air would be monitored to assist in setting the required level of protection. The level of protection may be upgraded if high contaminant concentrations are detected during excavation of soil, sediments, and debris at Site 30.

Environmental Impact

Excavation would result in short-term, temporary impacts to the environment. Upland impacts would include vegetation affected by equipment traffic from the access point to the working area and within the staging area adjacent to the excavation. These impacts should be minimal and would be mitigated by using post-construction restorative efforts or by using LGP equipment as necessary. Additionally, crane mats may be used where soft ground is present.

Non-mobile animals and a portion of the plants within the area enclosed by a temporary water-filled dam may be temporarily lost as a result of dewatering during the project. Any affected biota is expected to recolonize the unexcavated area after the dam is removed, however. In addition, the temporary dam would minimize any impacts to Seal Creek Marsh.

Impacts from excavation would include removal of all non-mobile biota in the excavation area. The excavation area would be reconstructed and restored so that no permanent impacts would occur. Final contours in a portion of the upland transition area adjacent to the shore would be lowered to promote pickleweed growth and enhance the habitat.

Air monitoring would assist in evaluating whether dust control measures are effective in limiting environmental impacts. In addition, equipment decontamination would prevent transport of contaminated soil, sediments, and debris to uncontaminated areas of Site 30. The remedy would be constructed in a manner to reduce potential impacts to biota in the adjacent areas.

Time Required for Removal Action

Approximately 2 months would be required to complete all removal activities associated with Alternative 4. The length of time required to excavate, remove, and dispose of contaminated soils and sediments off site may be affected by the following factors:

- The time required to dewater the excavation.
- The time required to characterize samples of the contaminated soil.
- Any additional volumes of debris encountered during excavation.
- The number of unanticipated obstructions encountered during excavation.
- The suitability of weather conditions.
- Access limitations imposed by the railroad to accommodate its operation.

Based on the five criteria above, Alternative 4 is considered to have an overall moderate level of short-term effectiveness.

4.10.2 Implementability

The technical and administrative feasibility and availability of resources required to implement Alternative 4 are discussed below.

4.10.2.1 Technical Feasibility

Alternative 4 is considered to have low to medium technical complexity, primarily because access to Site 30 is limited. Obtaining permission for construction within and near the railway easements, as well as mobilizing earth-moving equipment and truck transport of soil on and off the site, would be the greatest challenges. The Navy must consult with BNSF and Union Pacific on potential crossing of the rail lines and working within the rights-of-way. These constraints could delay the construction schedule by up to 3 to 6 months.

This alternative would use standard construction methods. Some added regulatory constraints would be encountered because Site 30 is a wetland. After the site has been reconstructed, annual monitoring for 1 to 3 years may be necessary to document that the wetland habitat has been re-established.

4.10.2.2 Administrative Feasibility

The alternative is administratively feasible. However, coordination with multiple regulatory agencies would be necessary to comply with action-specific ARARs.

4.10.2.3 Availability of Required Resources

Off-site commercial disposal capacity would be adequate to manage the relatively small volume of contaminated soil generated from Site 30 (approximately 4,400 yd^3). Several Class II and III permitted landfills are located close to Site 30. The nearest Class I permitted landfill is near Kettleman City, California. Many remediation firms have the equipment and specialists necessary to implement this alternative. However, sources of backfill for the wetland may not be near the site, making transport of this material difficult.

Overall, Alternative 4 is considered moderately highly implementable based on the associated technical and administrative challenges.

4.10.3 Cost

The overall cost of this alternative is considered moderate to high because of the high cost for waste disposal and importing suitable wetland backfill material to Site 30. Capital costs for this alternative assume that (1) the existing unimproved road that runs between the existing railroad tracks can be improved for use as a haul route to Site 30; (2) a haul route to Site 30 is not located within a habitat for any threatened or endangered species; (3) no federal jurisdictional issues are related to the haul route locations; and (4) there is no agreement in place between the Navy and regulatory agencies related to habitat issues. O&M costs associated with this alternative include annual monitoring for 1 to 3 years to document that wetland habitat is restored. The cost of the off-site Class I, II or III landfill disposal depends on several factors, such as (1) the distance from Site 30 to the landfill, (2) the volume of waste that requires disposal, and (3) the results of soil characterization.

Total estimated cost to complete this alternative is $1.9 million. Detailed cost estimates associated with this alternative are presented in Appendix B.

5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The alternatives identified and described in Section 4.0 are evaluated in this section relative to each other to provide a basis for recommending an appropriate action. Again, the alternatives evaluated in this section are:

- Alternative 1: No action
- Alternative 2: Monitoring
- Alternative 3: Excavation, stabilization, on-site disposal, LUCs, and habitat restoration
- Alternative 4: Excavation, off-site disposal, and habitat restoration.

The alternatives were compared in terms of effectiveness, implementability, and cost. A summary of the comparative analysis is provided in Tables 6 and 7.

5.1 EFFECTIVENESS OF ALTERNATIVES

Each alternative is evaluated against five criteria to assess its effectiveness: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction in toxicity, mobility, or volume through treatment; and (5) short-term effectiveness. Each of these criteria is discussed in the following paragraphs.

5.1.1 Overall Protection of Human Health and the Environment

Alternative 4 would provide the greatest overall protection to human health and the environment. Contaminated debris and soils are removed and disposed of off site in Alternative 4, preventing exposure of humans and ecological receptors to COPCs and COECs in the most biologically active soil layer (0 to 3 feet bgs). Alternative 4 is the most protective because the excavated contaminated soil, sediments, and debris would be completely removed from Site 30.

Alternative 3 involves on-site disposal of the stabilized excavated material by constructing a disposal cell. Site 30 cannot meet the "unrestricted use criteria" because land-use controls would be necessary for long-term protection of the soil disposal cell.

Alternatives 1 and 2 are not protective of human health or the environment under the unrestricted use (or residential) scenario because neither alternative prevents unrestricted use or addresses contaminants in soil, sediments, and debris that could pose a potential risk to human and ecological health.

5.1.2 Compliance with ARARs

Alternatives 1 and 2 do not comply with ARARs. Alternatives 3 and 4 would comply with all ARARs identified and discussed in Section 3.4.

5.1.3 Long-term Effectiveness and Permanence

Alternatives 1 and 2 provide no long-term effectiveness since site conditions would be unpredictable and uncontrolled and could result in future exposure to human and ecological receptors.

Alternative 3 presents some long-term residual risks since long-term effectiveness and permanence depend on the effectiveness of imposed LUCs at the disposal cell. Additionally, the disposal cell would require monitoring and possible maintenance. Groundwater monitoring downgradient of the disposal cell would be needed for 3 years.

Alternative 4 provides the best overall long-term effectiveness because it is a permanent solution that presents no residual risks to the site or to human or ecological receptors.

5.1.4 Reduction in Toxicity, Mobility, and Volume through Treatment

Alternatives 1 and 2 do not provide for a reduction in toxicity, mobility, or volume through treatment.

Alternative 3 would slightly increase the volume of waste, by 20 to 25 percent. It would reduce both the toxicity and mobility of hazardous substances.

Alternative 4 is assumed to require off-site treatment to comply with LDRs. Therefore, Alternative 4 also reduces the toxicity and mobility. Although the volume of hazardous substances at Site 30 would be reduced, it would be relocated to an appropriate disposal facility.

5.1.5 Short-term Effectiveness

Alternatives 1 and 2 are considered the most effective in the short term because no removal action would be taken.

Both Alternatives 3 and 4 are considered moderately effective in the short term, as both can be implemented with proper engineering controls to minimize short-term risk to human health and the environment. Alternative 4 is considered slightly less effective in that waste would be transported off site, with appropriate transportation and dust control safeguards.

5.2 IMPLEMENTABILITY OF ALTERNATIVES

Alternative 1 is the easiest to implement because no action would be taken. Alternative 2 would be easy to implement because no removal action would be undertaken; only monitoring is required. Alternatives 3 and 4 are more difficult to implement because of the administrative actions as well as the technical constructability issues. Alternative 3 is more difficult to implement than Alternative 4 because of the requirements for the on-site soil disposal cell and stabilization process.

5.3 COST OF ALTERNATIVES

Table 8 summarizes the costs associated each alternative. There is no cost for Alternative 1. The total cost for Alternative 2 is estimated at $382,000. The total cost for Alternative 3 is estimated at $2.1 million and for Alternative 4 at $1.9 million. A detailed description of the costs, including capital and O&M costs, is presented in Appendix B.

6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

This draft EE/CA was performed in accordance with current EPA and U.S. Navy guidance for a NTCRA under CERCLA and the NCP. This EE/CA identified and analyzed alternative removal actions to address Site 30, which could serve as the final site action. Four alternatives were identified, evaluated, and ranked:

- Alternative 1: No action
- Alternative 2: Monitoring
- Alternative 3: Excavation, stabilization, on-site disposal, LUCs, and habitat restoration
- Alternative 4: Excavation, off-site disposal, and habitat restoration.

Results of the comparative analysis are summarized in Tables 6 and 7 and indicate that Alternative 4 ranks the highest among the four alternatives considered. Alternative 4 provides adequate protection to human and ecological health and is more implementable than Alternative 3 from a constructability standpoint.

7.0 REFERENCES

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FIGURES

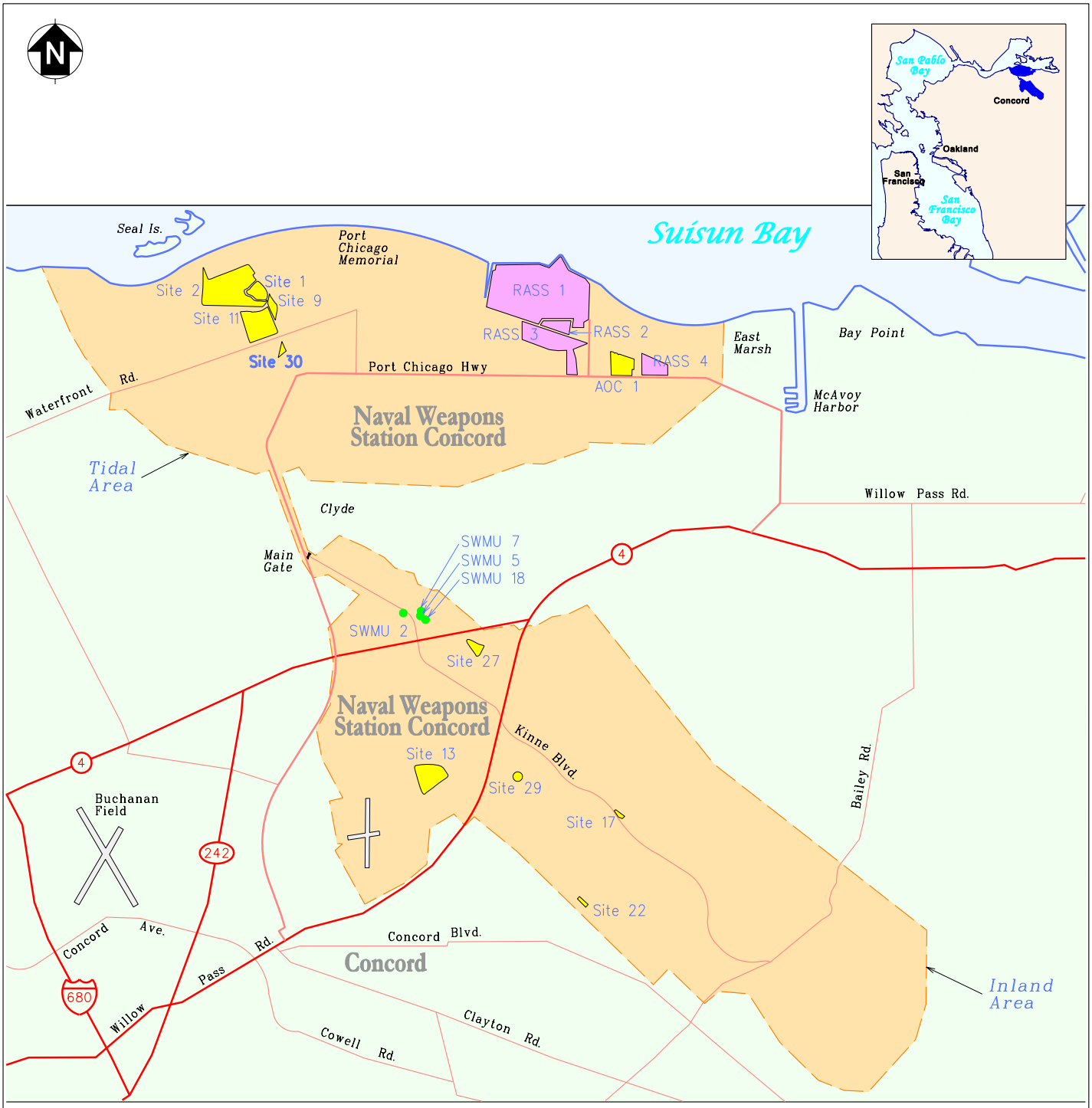

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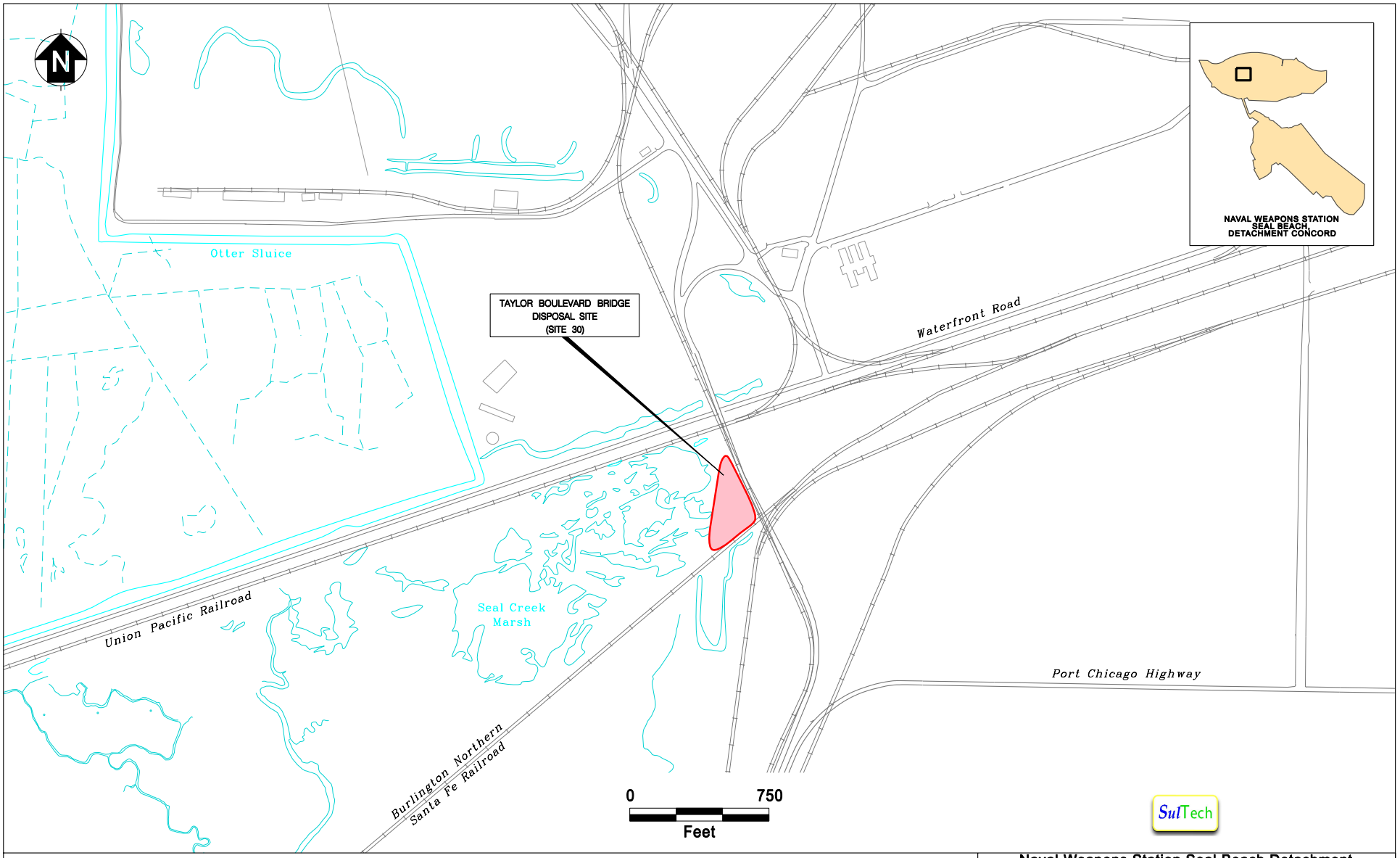
FIGURE 1
TIDAL AREA AND INLAND AREA INVESTIGATION SITES

Engineering Evaluation and Cost Analysis Report
for the Taylor Boulevard Bridge Disposal Site



Railroad Tracks
Road
Building
Wetlands

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FIGURE 2
LOCATION OF
TAYLOR BOULEVARD BRIDGE
DISPOSAL SITE

Engineering Evaluation and Cost Analysis Report
for the Taylor Boulevard Bridge Disposal Site

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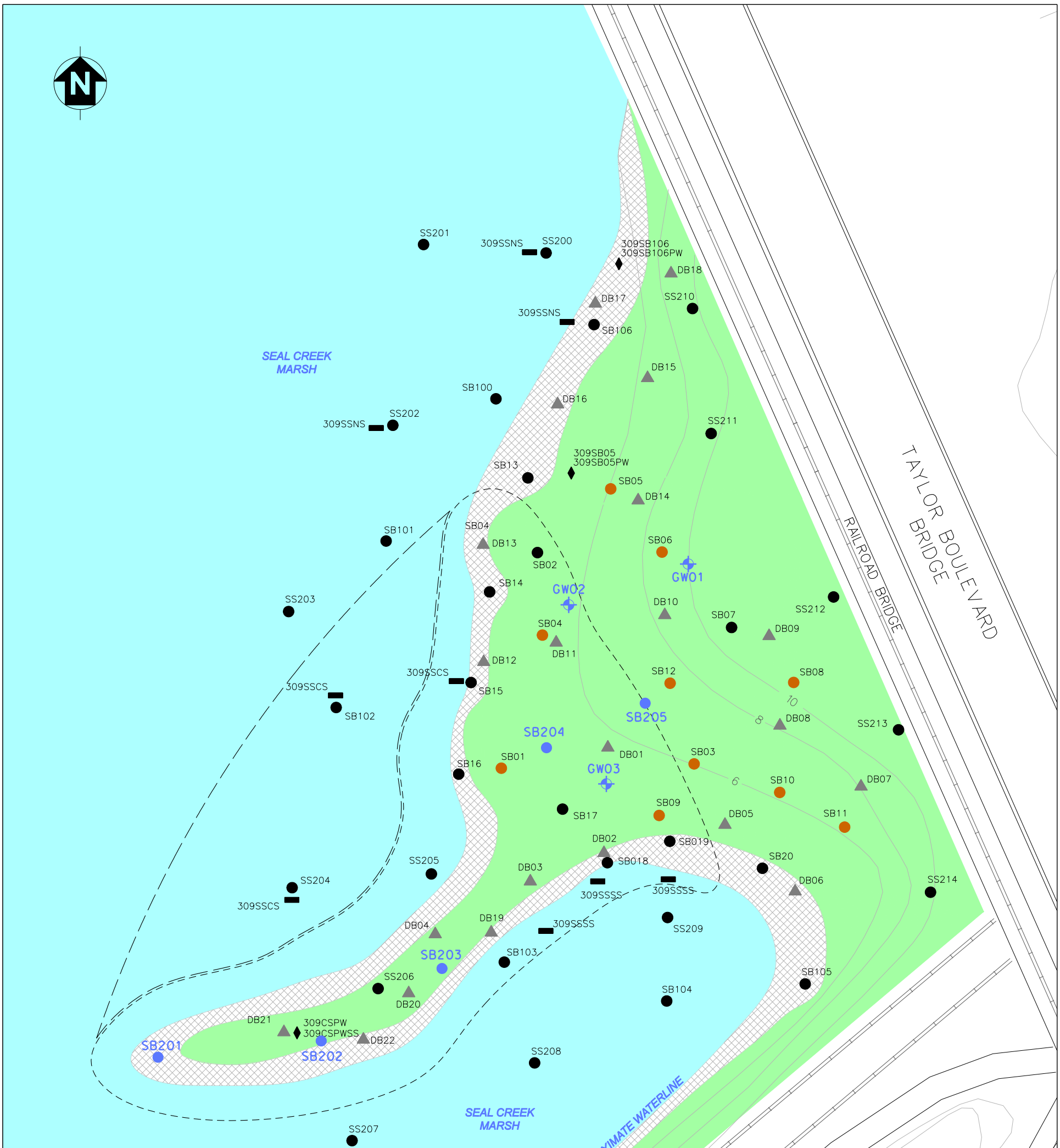

20 0 20 40

Feet

LEGEND:

- 2003 DEBRIS TEST HOLE AND SEDIMENT SAMPLE
- GROUNDWATER MONITORING WELL
- SOIL/SEDIMENT SAMPLE (0–0.5 FEET)
- SOIL/SEDIMENT SAMPLE (0–0.5 FEET AND 1.0–2.5 FEET)
- DEBRIS TEST HOLE
- 3 SAMPLES COMPOSITED FOR METALS ANALYSIS AND BIOASSAY
- PICKLEWEED TISSUE, COLLOCATED SEDIMENT ANALYSIS
- WETLAND AND UPLAND TRANSITIONAL HABITAT
- AQUATIC HABITAT
- SHORELINE: APPROXIMATE SEASONAL WATER LEVEL VARIATION
- AMPHIPOD TISSUE COLLECTION AREA
- APPROXIMATE SHORELINE
- 8 EXISTING ELEVATION CONTOURS
- APPROXIMATE EXTENT OF DEBRIS
- SCATTERED SURFACE DEBRIS

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FIGURE 3
SAMPLING LOCATION MAP
TAYLOR BOULEVARD BRIDGE DISPOSAL SITE

Engineering Evaluation and Cost Analysis Report
for the Taylor Boulevard Bridge Disposal Site

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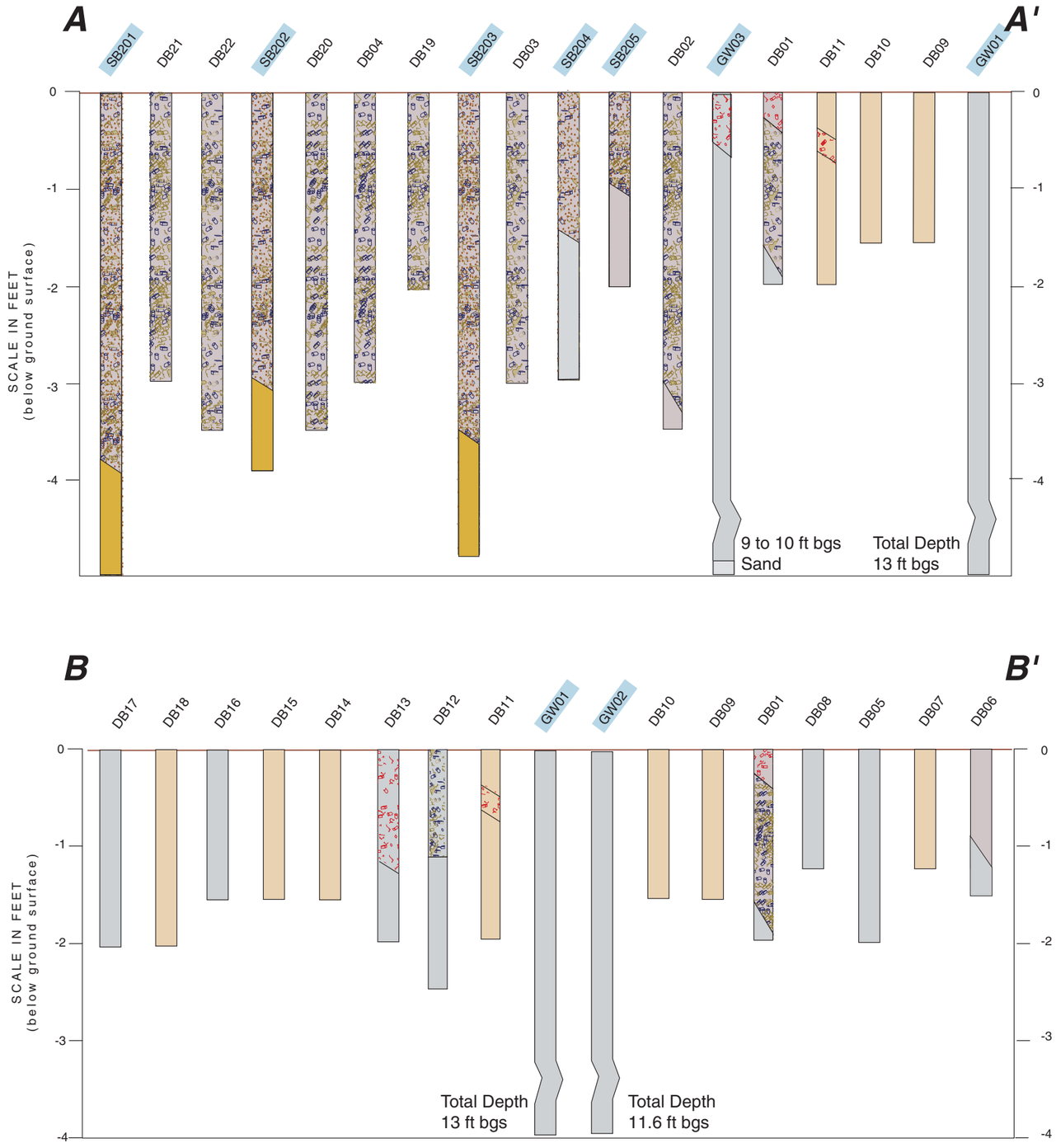

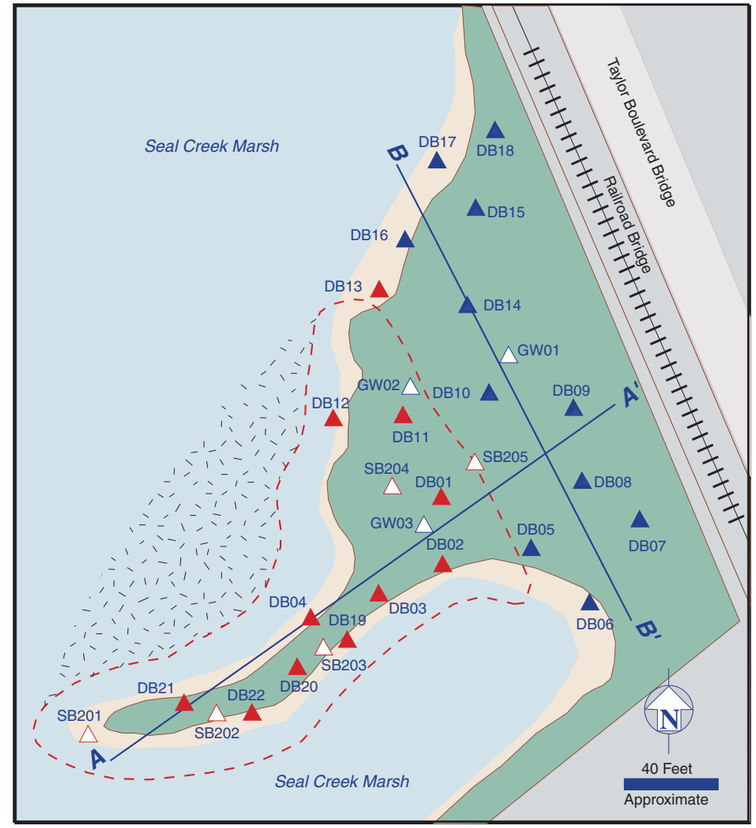

LEGEND

- Organic Silt
- Sandy Silt
- Clayey Silt
- Silty Clay
- Peat
- 2003 Location Debris Test Holes and Well Borings
- Debris Test Holes - no debris
- Debris Test Holes - with debris
- 2003 Debris Test Holes - with debris
- 2003 Well Borings
- Heavy Debris (>75%)
- Light Debris (<25%)
- Primary Surface and Subsurface Debris Area
- Scattered Surface Debris
- Shoreline: Approximate Seasonal Water Level Variation

Notes:
Horizontal distances are not to scale
ft bgs = feet below ground surface

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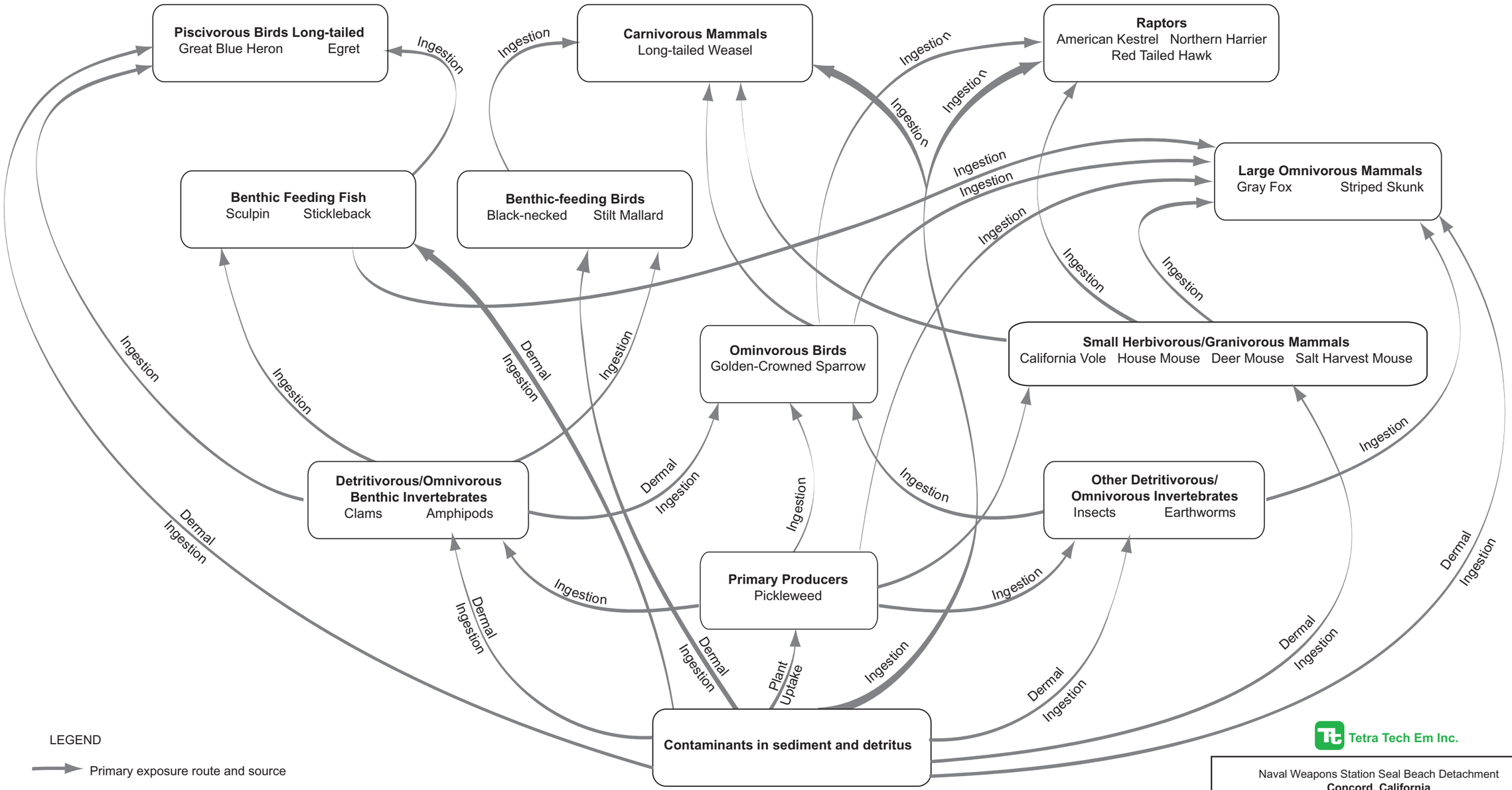
FIGURE 4
TAYLOR BOULEVARD BRIDGE
DISPOSAL SITE
DEBRIS TEST HOLE PROFILES

ENGINEERING EVALUATION AND COST ANALYSIS REPORT
FOR THE TAYLOR BOULEVARD BRIDGE DISPOSAL SITE



LEGEND

→ Primary exposure route and source

NOTE

The habitat provided at the TTB disposal area is minimal due to its small size, consequently, use of the site by top level receptors is expected to be minimal.

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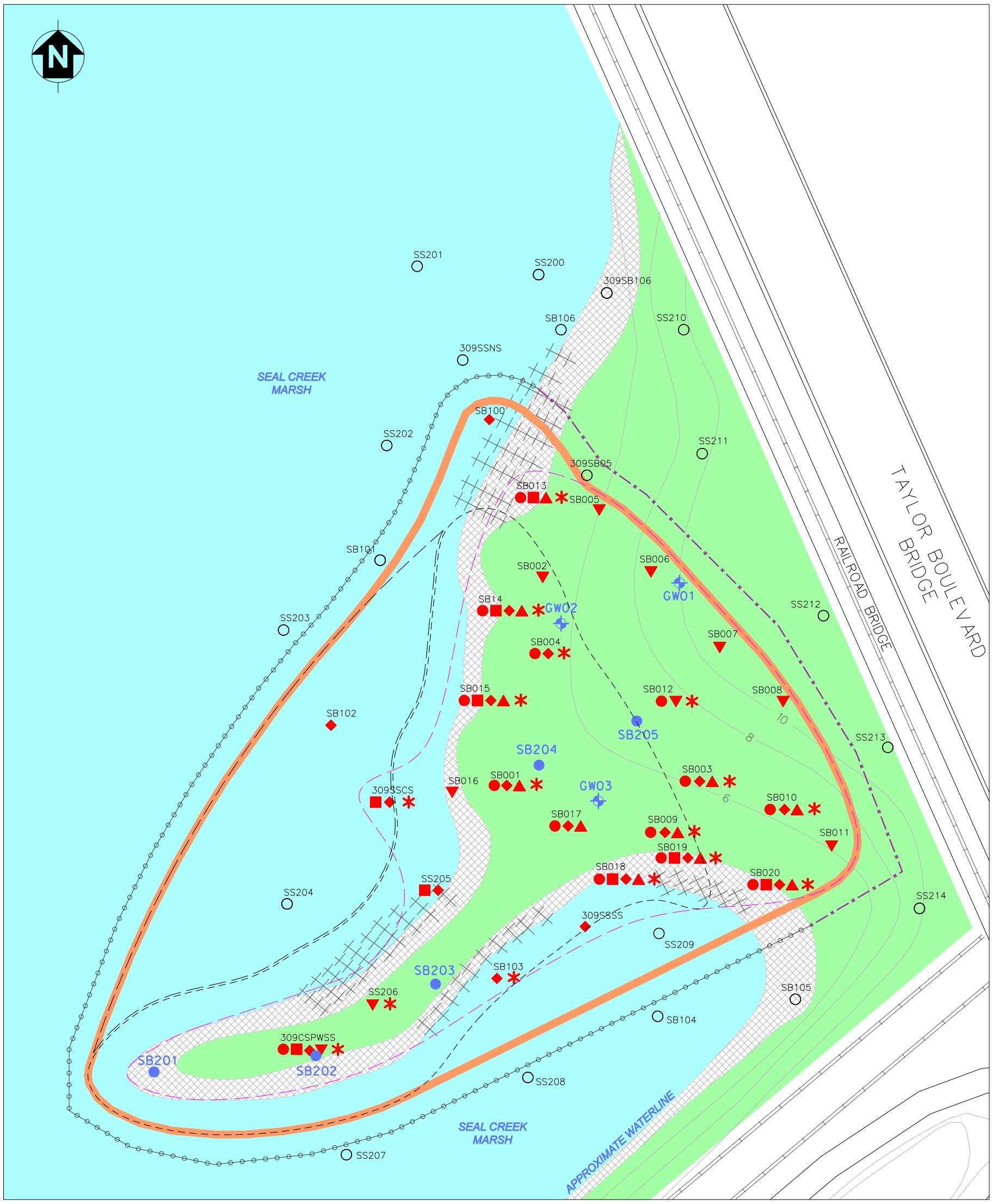
FIGURE 5
CONTAMINANT EXPOSURE AND FLOW DIAGRAM

ENGINEERING EVALUATION AND COST ANALYSIS REPORT
FOR THE TAYLOR BOULEVARD BRIDGE DISPOSAL SITE



2003 DEBRIS TEST HOLE AND SEDIMENT SAMPLE

GROUNDWATER MONITORING WELL

MINIMAL RISK TO ASSESSMENT ENDPOINT RECEPTORS

RISK TO HUMAN HEALTH; LEAD PRG > 400 mg/kg.

RISK TO PLANTS INDICATED; SAMPLE LOCATION HAS FIVE OR MORE HQs GREATER THAN 1.0

RISK TO BENTHIC INVERTEBRATES INDICATED; ONE OR MORE MEAN ER-Mq GREATER THAN 1.5

RISK TO BIRDS INDICATED; SAMPLE LOCATION HAS ONE OR MORE METAL CONCENTRATIONS GREATER THAN 95th PERCENT UCL

RISK TO SALT MARSH HARVEST MICE INDICATED; SAMPLE LOCATION HAS TWO OR MORE HQ (Low Dose/High TRV) GREATER THAN 1.0

RISK TO SALT MARSH HARVEST MICE INDICATED; SAMPLE LOCATION HAS TWO OR MORE HQ (High Dose/High TRV) GREATER THAN 1.0

WETLAND AND UPLAND TRANSITIONAL HABITAT

AQUATIC HABITAT

SHORELINE: APPROXIMATE SEASONAL WATER LEVEL VARIATION

PRIMARY SURFACE AND SUBSURFACE DEBRIS AREA

SCATTERED SURFACE DEBRIS

APPROXIMATE RISK FOOTPRINT (HUMAN HEALTH + ECOLOGICAL)

AMPHIPOD TISSUE COLLECTION AREA

PROPOSED MOUSE FENCE

PROPOSED AQUA BARRIER

PROPOSED EXCAVATION AREA

NOTES:

UCL	UPPER CONFIDENCE LIMIT
mg/kg	MILLIGRAMS PER KILOGRAM
PRG	PRELIMINARY REMEDIATION GOAL
TRV	TOXICITY REFERENCE VALUE
ER-Mq	EFFECTS-RANGE MEDIAN QUOTIENT
HQ	HAZARD QUOTIENT

SAMPLES 309SSNS, 309SSSS, AND 309SSCS ARE COMPOSITES POOLED FROM THREE SEDIMENT SAMPLES

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FIGURE 6
ESTIMATED RISK TO ASSESSMENT ENDPOINT RECEPTORS TAYLOR BOULEVARD BRIDGE DISPOSAL SITE

Engineering Evaluation and Cost Analysis Report for the Taylor Boulevard Bridge Disposal Site

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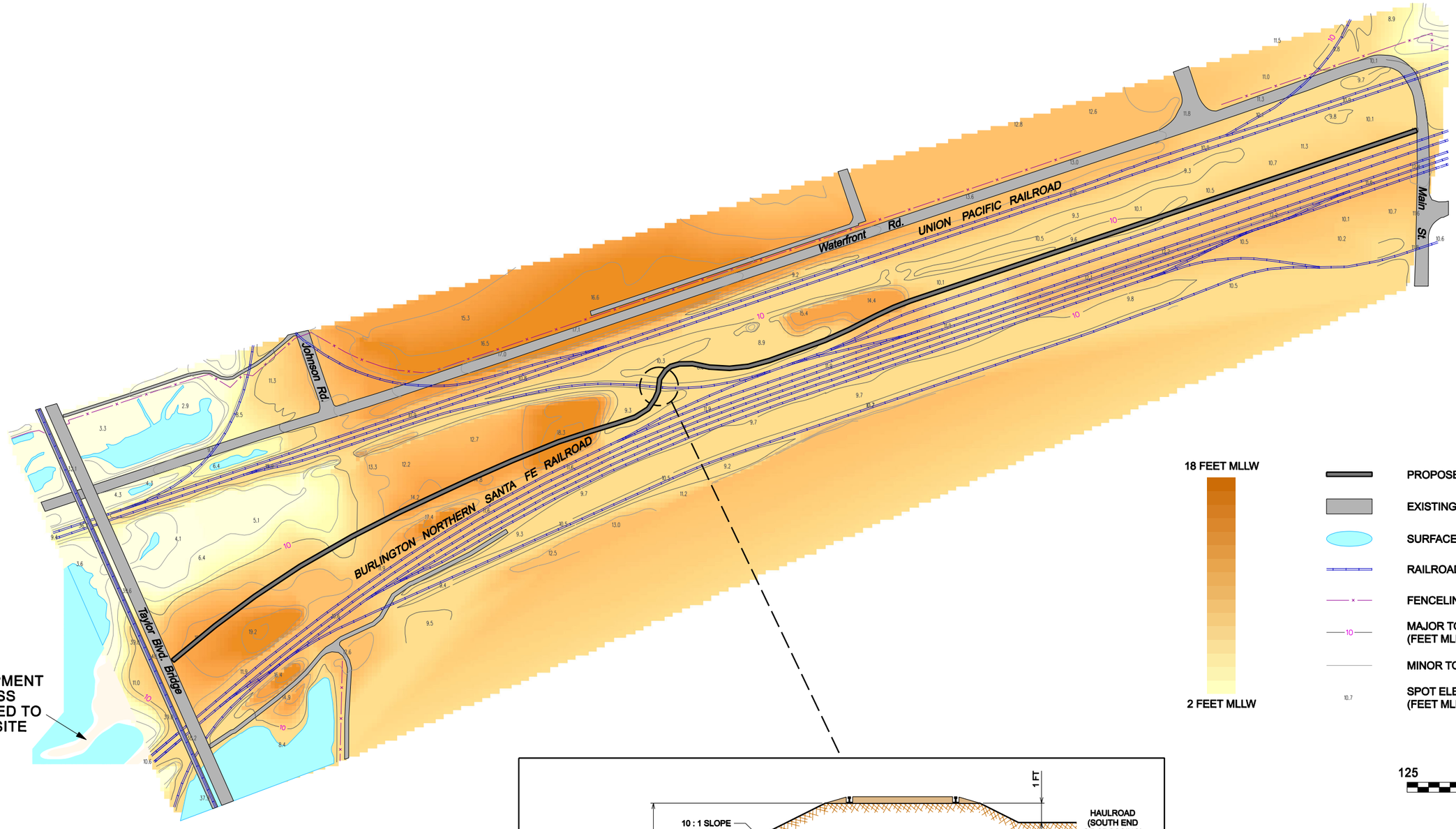
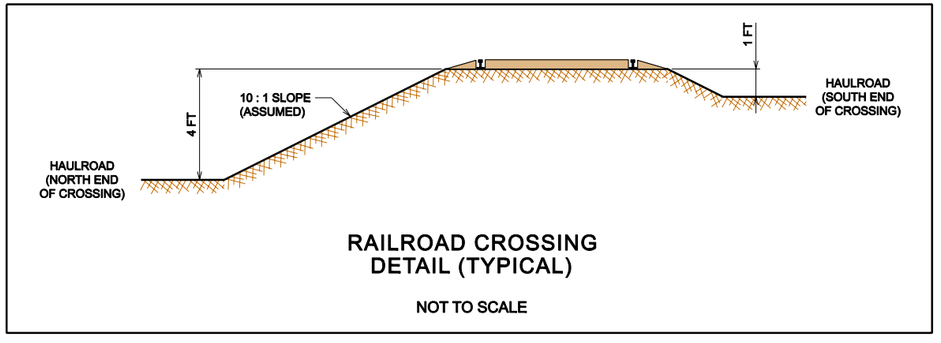


18 FEET MLLW

2 FEET MLLW

- PROPOSED ACCESS ROAD
- EXISTING ROAD
- SURFACE WATER
- RAILROAD TRACK
- FENCELINE
- MAJOR TOPOGRAPHIC CONTOUR (FEET MLLW)
- MINOR TOPOGRAPHIC CONTOUR
- SPOT ELEVATION (FEET MLLW)



RAILROAD CROSSING DETAIL (TYPICAL)

NOT TO SCALE

125 0 125 250

Feet

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FIGURE 7
PROPOSED HAULING AND ACCESS ROAD TAYLOR BOULEVARD BRIDGE

Engineering Evaluation and Cost Analysis Report for the Taylor Boulevard Bridge Disposal Site

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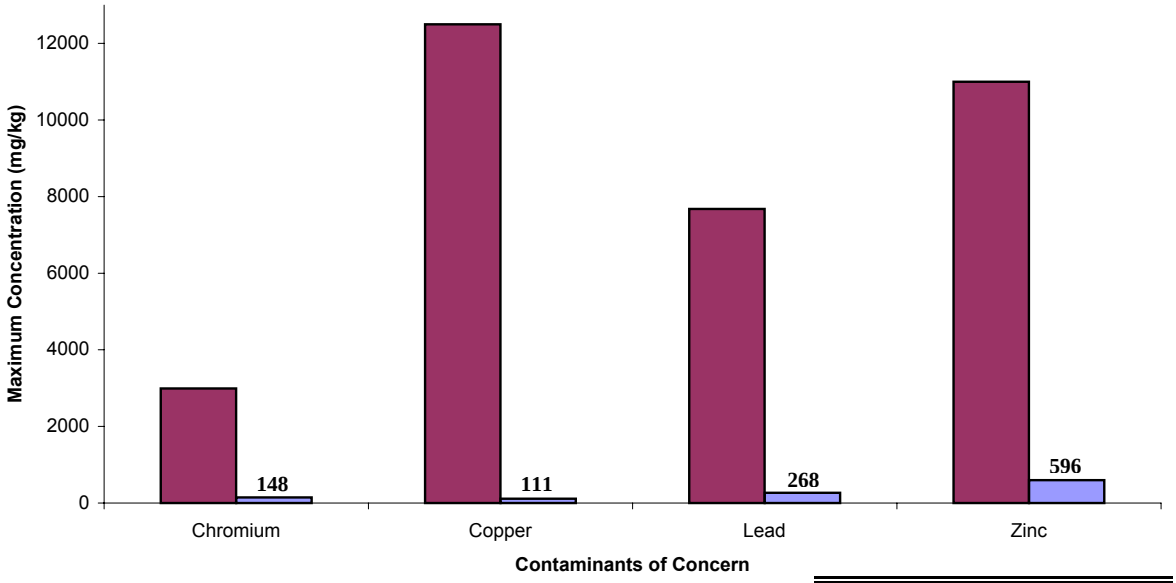
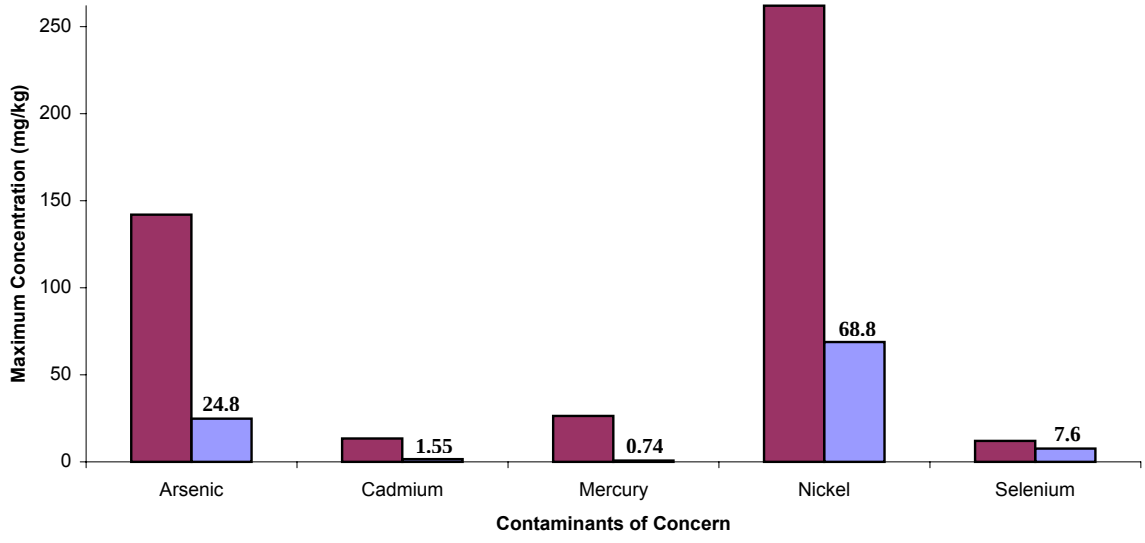
Maximum Concentrations of Contaminants of Concern Within and Outside the Excavation Area



Tidal Area Ambient Concentrations	
Chromium	82.1
Copper	81
Lead	95
Zinc	264



Tidal Area Ambient Concentrations	
Arsenic	27
Cadmium	1.9
Mercury	0.32
Nickel	120
Selenium	not available

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FIGURE 8
REMOVAL OF CHEMICALS OF CONCERN COLLOCATED WITH LEAD

ENGINEERING EVALUATION AND COST ANALYSIS REPORT
FOR THE TAYLOR BOULEVARD BRIDGE

35 x 35 ft
Grid

SEAL CREEK
MARSH

0.5
1.0
0.5
1.5
2.0
1.0
0.5
1.0
0.5
3.5
2.0
4.0
0.5
4.0
3.0
3.75
3.5

SEAL CREEK
MARSH

APPROXIMATE WATERLINE

RAILROAD BRIDGE

TAYLOR BOULEVARD
BRIDGE

10
8
6

20 0 20 40
Feet

PROPOSED MOUSE FENCE

PROPOSED AQUA BARRIER

PROPOSED BOTTOM CONFIRMATION SAMPLE

2.0 PROPOSED EXCAVATION BOUNDARY
NUMBER INDICATES DEPTH IN FEET

WETLAND AND UPLAND TRANSITIONAL HABITAT

AQUATIC HABITAT

SHORELINE: APPROXIMATE SEASONAL WATER LEVEL VARIATION

PRIMARY SURFACE AND SUBSURFACE DEBRIS AREA

APPROXIMATE RISK FOOTPRINT (HUMAN HEALTH + ECOLOGICAL)

PROPOSED EXCAVATION AREA

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FIGURE 9
PROPOSED EXCAVATION FOOTPRINT

Engineering Evaluation and Cost Analysis Report
for the Taylor Boulevard Bridge Disposal Site

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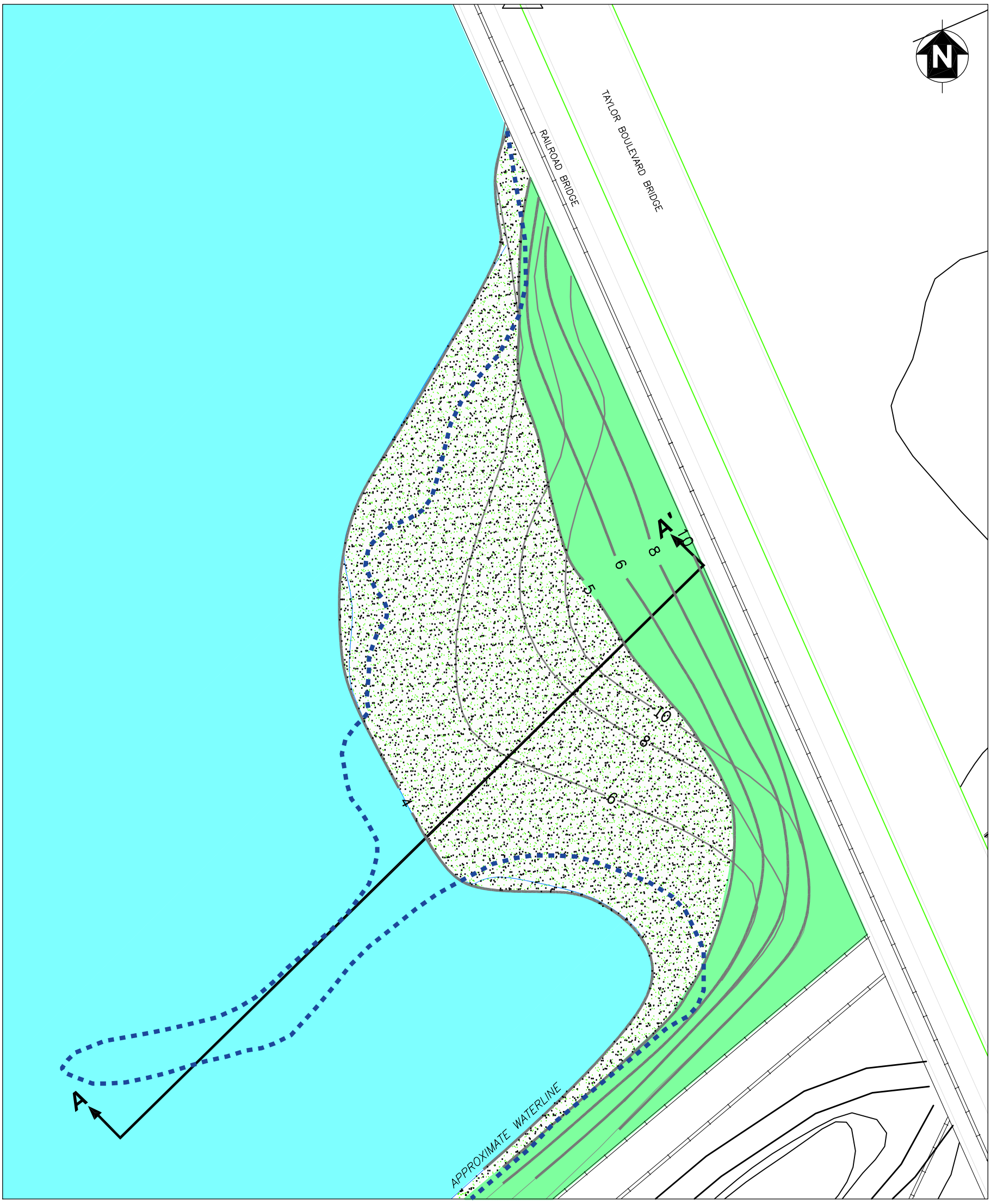

Legned

20 0 20 40

Scale in Feet

- Wetland and upland transitional habitat
- Aquatic habitat
- Wetland habitat (Pickleweed and Gumplat)
- Original shoreline
- Approximate shoreline
- 8 Existing elevation contours
- 6 New elevaiton contours

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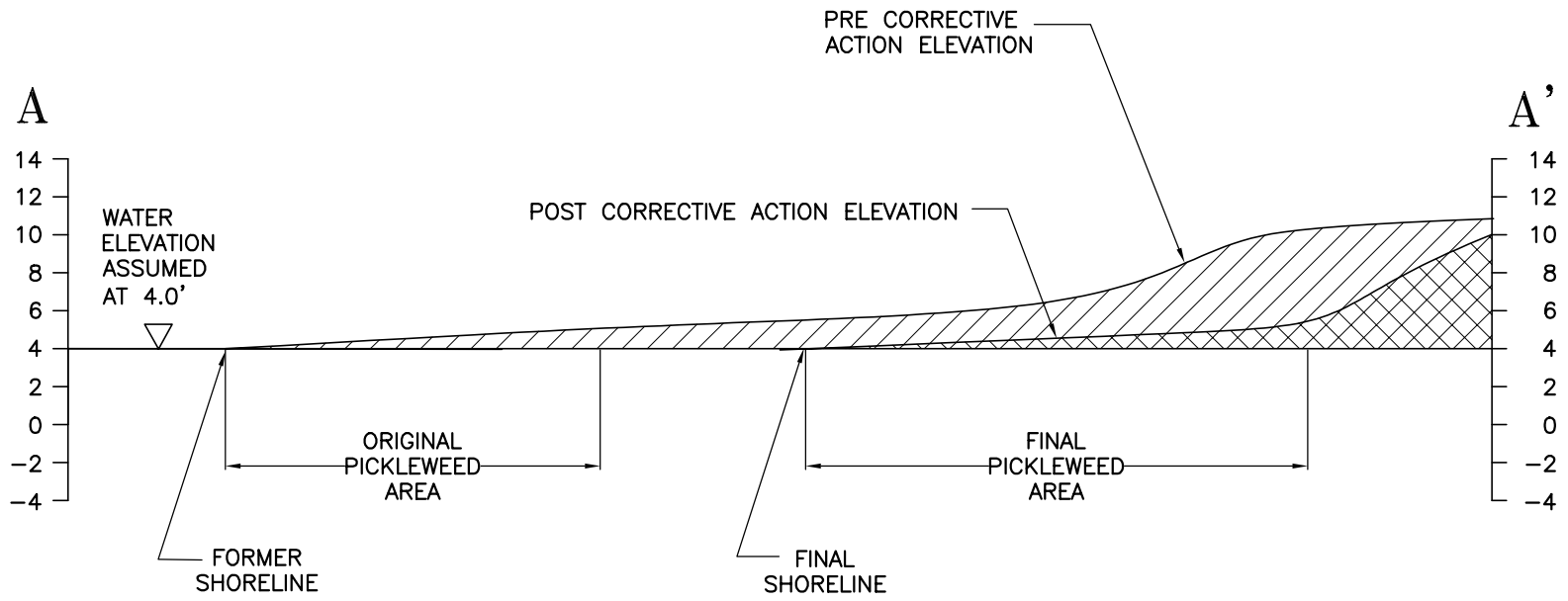
FIGURE 10
TAYLOR BOULEVARD BRIDGE
DISPOSAL SITE
CONCEPTUAL REGRADING PLAN

Engineering Evaluation And Cost Analysis Report
for The Taylor Boulevard Bridge Disposal Site



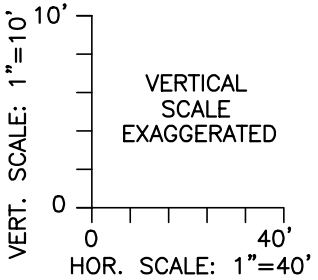


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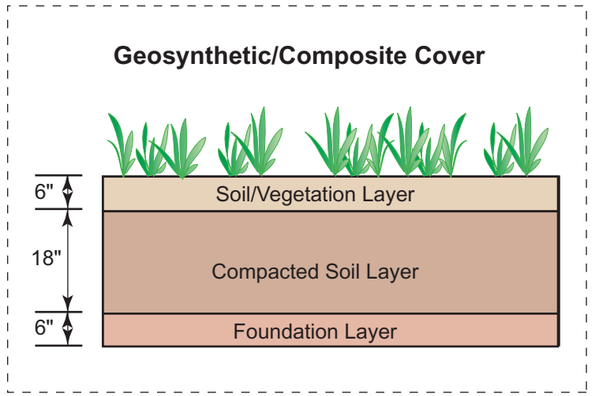
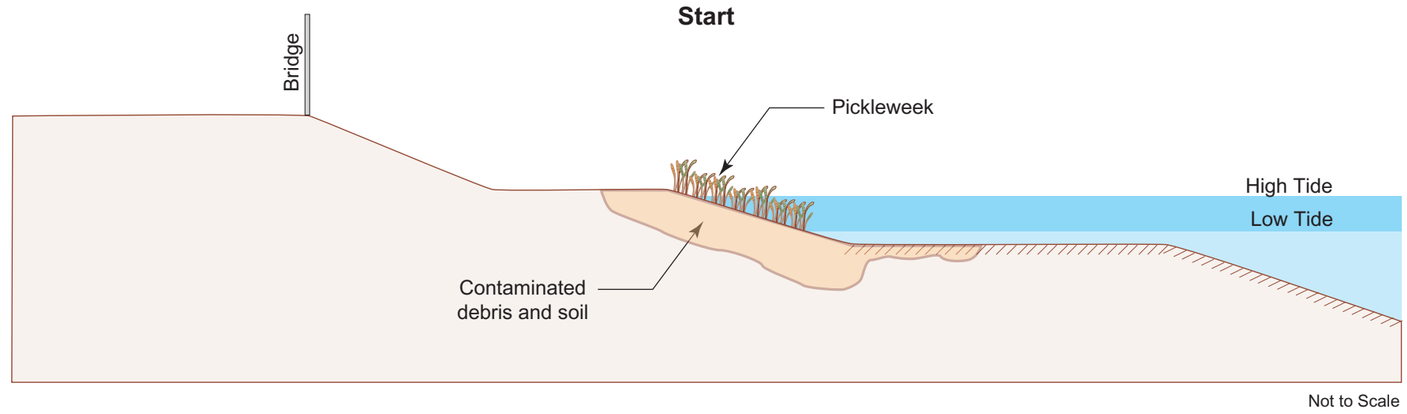
FIGURE 11
TAYLOR BOULEVARD BRIDGE
DISPOSAL SITE
CROSS SECTION SHOWING PROPOSED EXCAVATION AND SITE RECONSTRUCTION LIMITS

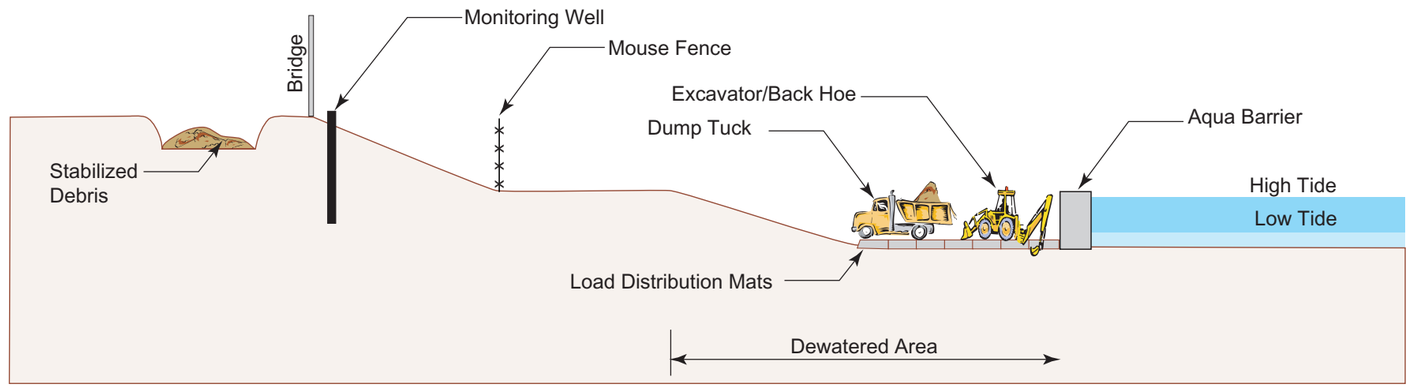
ENGINEERING EVALUATION AND COST ANALYSIS REPORT
FOR THE TAYLOR BOULEVARD BRIDGE DISPOSAL SITE



INSET



Construction Alternative 3



Post Construction Alternative 3

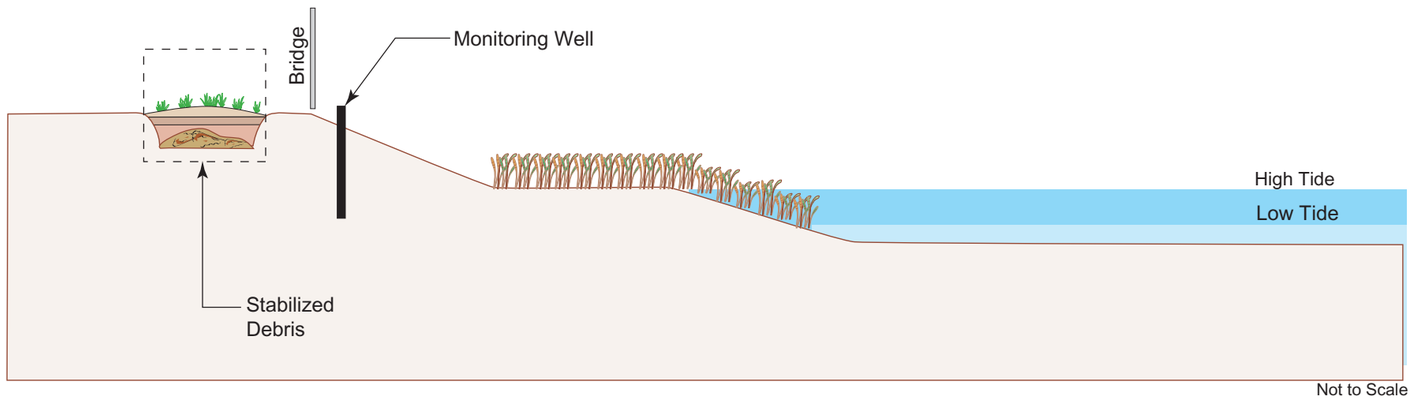


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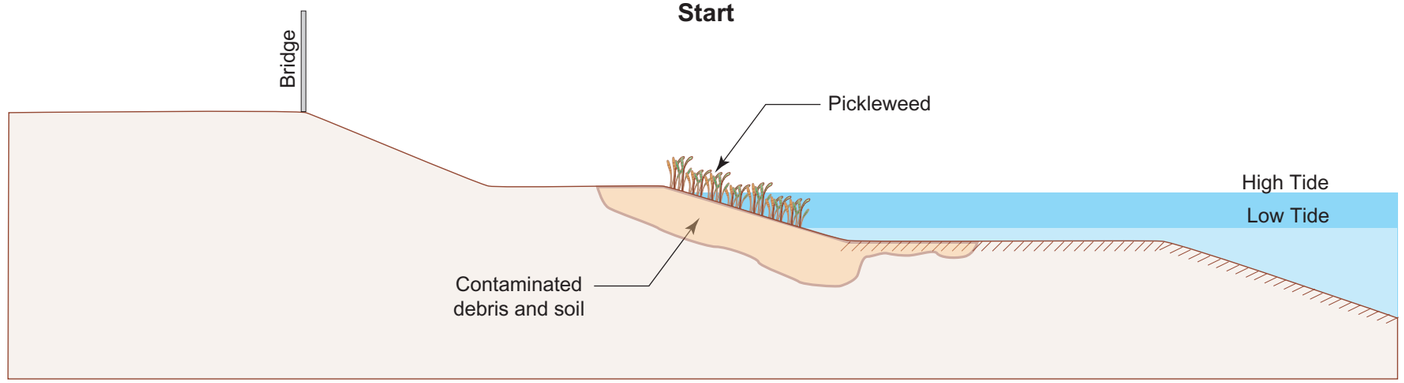
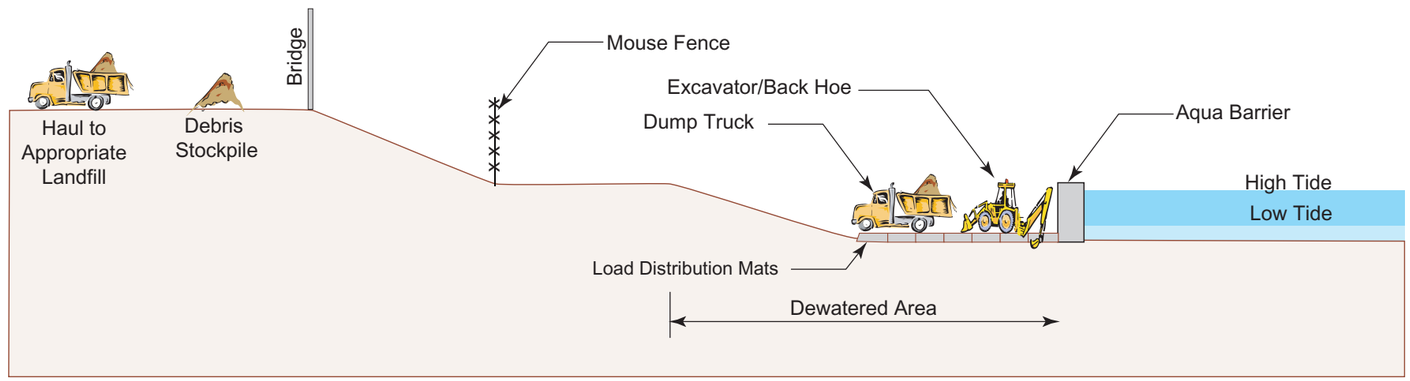
FIGURE 12
ALTERNATIVE 3
REMOVAL ACTION SCHEMATIC

Engineering Evaluation And Cost Analysis Report
For The Taylor Boulevard Bridge Disposal Site

Start



Construction Alternative 3



Post Construction Alternative 3

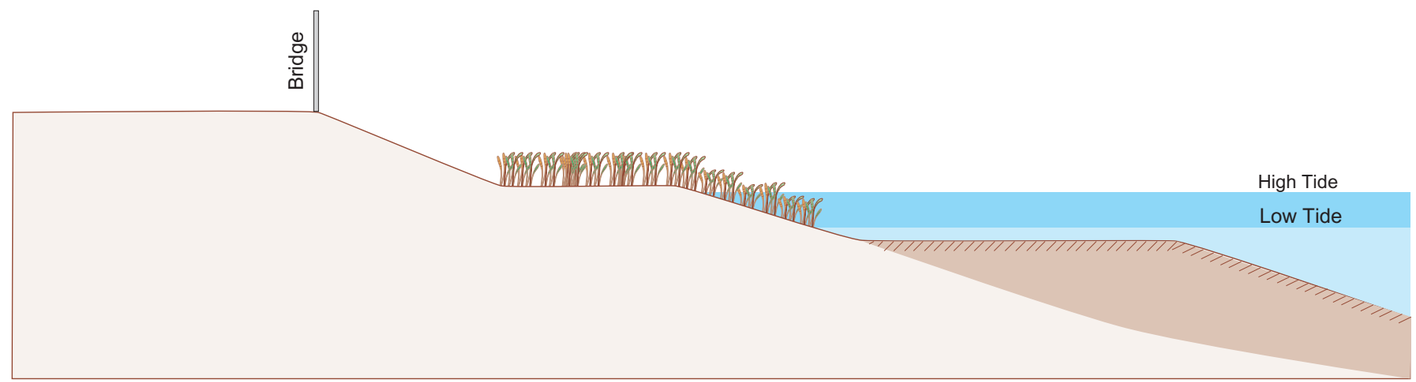


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FIGURE 13
ALTERNATIVE 4
REMOVAL ACTION SCHEMATIC

Engineering Evaluation And Cost Analysis
For The Taylor Boulevard Bridge Disposal Site

TABLES

TABLE 1: HISTORY OF SITE INVESTIGATIONS FOR TAYLOR BOULEVARD BRIDGE DISPOSAL SITE (SITE 30)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Date	Investigation	Investigation Objective	Investigation Activity	Analytical Groups	Summary of Analytical Results	Conclusions
February 1996 – June 1998	Initial Investigation [a]	**February 1996** - Delineate chemical concentrations in TBB site sediment. **March 1997 -** Evaluate lateral extent of metals and estimate approximate volume of materials to be removed as part of future removal action. **October 1997 - June 1998** - Evaluate lateral extent of metals in surface sediment in adjacent submerged region of seal creek marsh.	**February 1996** - Six sediment samples collected from three borings: three samples at 0 to 0.5 feet bgs and three samples at 2 to 2.5 feet bgs. No samples were analyzed for pesticides and PCBs because the large amount of glass debris suggested a disposal area for household waste rather than industrial waste. **March 1997 -** Sampling at nine borings at 0 to 0.5 feet bgs and 1 to 1.5 feet bgs. **October 1997 - June 1998** -Three rounds of surface sediment sampling, 48 samples collected.	**February 1996 - SOIL:** SVOCs, metals, Total Peteroleum Hydrocarbons (TPH) purgeable and extractable. **March 1997 - SOIL**: Metals, TPH, SVOCs **October 1997-June 1998 - SOIL**: Metals	**Inorganic Chemicals in Sediments** • 60 sediment samples collected - Aquatic habitat - 17 surface sediments - Transitional habitat –20 surface and 12 subsurface samples collected - Shoreline – 11 surface sediments • Except for aluminum and beryllium, maximum detected concentrations of inorganic chemicals were in surface sediment samples. • Detailed analytical results can be found in Appendix D of the RI report **Organic Chemicals in Sediments** • 24 samples collected from wetland and upland transitional habitat • Highest concentration of SVOCs detected at location SB003 (Figure 3) • With the exception of phenol, SVOCs were not detected in subsurface sediment samples. • Detailed analytical results can be found in Appendix D of the RI report [a]	**February 1996** - Additional sampling required **March 1997** The pattern of organic chemicals detected does not suggest a significant spill, since deeper sediments are not affected. SVOCs and TPH will not be evaluated in future sampling rounds. Vertical extent of the site chemicals considered delineated, lateral extent of elevated metals concentrations not defined. Additional sampling required. Based on preliminary evaluations of the chemicals spatial distribution in sediment, removal action may be necessary. **October 1997-June 1998**: Additional sampling required to complete RI.
February - March 2000	ERA focused sampling [a]	Additional sampling to address the data needs for a baseline ecological risk assessment (BERA)	Three composite sediment samples, three collocated sediment and pickleweed samples, and three collocated sediment and amphipod tissue samples collected. 22 debris test holes were dug to characterize the depth and lateral extent of site debris.	**Composite sediment Samples**: Metals analysis and bioassays. **Pickleweed and Amphipods**: Tissue residue analysis	• Analytical results from the BERA sampling are discussed in Section 8 of the RI Report. • Peninsula section contains the greatest amount of debris extending to depths greater than 3.0 bgs. • Detailed information on the extent of site debris can be found in Section 2.3 of this report and Section 5.0 of the RI report [a]	Concentrations of inorganic chemicals (primarily lead) at the center of the site are higher than concentrations detected in surrounding areas and are sufficiently high to present a potential risk to plants, benthic invertebrates, and aquatic birds as well as a significant risk to the salt marsh harvest mouse. Removal of debris would significantly reduce risk to both human and ecological receptors Comments received from the U.S. EPA and the RWQCB on the draft and draft final RI (Tetra Tech 2002) indicated that additional RI activities needed to be conducted.

TABLE 1: HISTORY OF SITE INVESTIGATIONS FOR TAYLOR BOULEVARD BRIDGE DISPOSAL SITE (SITE 30) (CONTINUED)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Date	Investigation	Investigation Objective	Investigation Activity	Analytical Groups	Summary of Analytical Results	Conclusions
December 2001	RWQCB Surface Water Sampling	N/A	Seven surface water samples collected directly off-shore from the TBB site. Samples screened against freshwater continuous concentration criteria based on hardness from EPA State California Water Quality Criteria (California Toxics Rule) (EPA 2000; RWQCB 1995).	**Soil:** Total and dissolved metals.	• Concentrations for both total and dissolved metals were well below the ambient water quality control values calculated based on a hardness of 400 milligrams per liter (mg/L). • Detailed analytical results can be found in Appendix N of the RI report [a]	The RWQCB data support that the TBB Disposal Site is not a source of contamination to the Seal Creek Marsh.
November 2003 – February 2004	Supplemental RI Sampling [b]	Characterize groundwater quality. Assess the vertical extent of debris. Characterize the concentrations of inorganic and organic chemicals present in sediment beneath the debris.	Three groundwater monitoring wells installed. Groundwater samples collected to evaluate whether site related chemicals have migrated to groundwater and adversely affected groundwater quality. Vertical extent of debris assessed by hand-augering five borings to sediment just below the debris. Samples of underlying sediment were collected from each boring for analysis.	**Soil:** Total metals, hexavalent chromium, pesticides, PCBs, pesticides, SVOCs, VOCs, TPH, pH, TOC, and dioxins. **Groundwater**: Total metals, hexavalent chromium, PCBs, pesticides, VOCs, SVOCs, TPH, TOC, TSS, PH and dioxins.	• Arsenic, cadmium, copper, lead, selenium, and zinc were detected in sediments above screening criteria. • Concentrations of metals were highest on the peninsula where the debris extends into groundwater. • At location SB-05, which is in the center of the site where debris does not intersect groundwater, concentrations beneath the debris were not elevated, which agrees with the findings of the RI (Tetra tech 2002) • Pesticides, PCBs, and SVOCs were not detected. Low concentrations of dioxins and furans were detected in one sediment sample. • Aluminum, arsenic, copper, mercury, and nickel were detected in groundwater at concentrations above screening criteria. • No SVOCs, pesticides, PCBs or dioxins were detected in groundwater samples • Groundwater level measurements collected from the wells suggest that the potentiometric surface at the site was nearly flat (gradient less than 0.001 foot per foot) with a westward gradient of approximately 0.002 foot per foot.	Results of the investigation suggest that leaching from the debris to subsurface sediment may be occurring in low-lying areas of the site closest to the shoreline, where the debris is within the groundwater. The additional data obtained during the supplemental investigation support the conclusions of the RI Therefore, a non-time-critical removal action for the Site 30 is recommended

Notes:

a Tetra Tech. 2002. "Draft Final Remedial Investigation for Taylor Boulevard Bridge Disposal Site, Tidal Area, NWS SB, Detachment Concord, January 31.
b Tetra Tech. 2004. "Remedial Investigation Addendum Report for the Taylor Boulevard Bridge (Site 30), NWS SB, Detachment Concord." June 24.

bgs Below ground surface
BERA Baseline Ecological Risk Assessment
EPA U.S. Environmental Protection Agency
PCB Polychlorinated biphenyls
RWQCB Regional Water Quality Control Board
RI Remedial investigation
SVOC Semivolatile organic compound
TPH Total petroleum hydrocarbons
TOC Total organic carbon
TSS Total suspended solids
VOC Volatile organic compounds

TABLE 2: SITE EVALUATION FOR TAYLOR BOULEVARD BRIDGE DISPOSAL SITE
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Sediment Evaluation		Groundwater Evaluation	
Organic Chemicals	**Inorganic Chemicals**	**Organic Chemicals**	**Inorganic Chemicals**
• Twenty-four sediment samples were analyzed specifically for TPH (extractable) and SVOCs (Figure 3). • Six sediment samples collected from locations SB001, SB002, and SB003 were also analyzed for TPH (purgeable). • All samples were collected from the wetland and upland transitional habitat. • Sediment samples from locations SB001 through SB003 were collected from 0 to 0.5 and 2.0 to 2.5 feet bgs. Sediment samples from SB004 through SB012 were collected from 0 to 0.5 and 1.0 to 1.5 feet bgs. • Petroleum hydrocarbons detected in sediment samples analyzed for extractable TPH were primarily TPH-mo. • TPH compounds (purgeable) were not detected in any samples. • The distribution of TPH in the sediment samples suggests a limited release of petroleum hydrocarbons, possibly caused by leakage of oil from construction vehicles and equipment dating from construction of the Taylor Boulevard automobile and railroad bridges. • Twenty-four sediment samples were analyzed for SVOCs. The highest concentration was detected in the surface sediment sample from location SB003. With the exception of phenol, SVOCs were not detected in subsurface sediment samples. • Detailed results can be found in the RI and RI addendum report (Tetra Tech 2002, 2004)	• Sixth sediment samples were analyzed for metals, including 17 surface sediment samples (0 to 0.5 feet bgs) collected in the aquatic habitat, 20 surface and 12 subsurface sediment samples (1.0 to 2.5 feet bgs) from the "wetland and upland transitional" habitat, and 11 surface sediment samples collected from the shoreline (included in both aquatic and wetland and upland transitional habitats) (Figure 3). • The maximum detected concentrations of arsenic (33 mg/kg), cadmium (6.10 mg/kg), copper (740 mg/kg), zinc (11,000 mg/kg), and selenium (1.2 mg/kg) were contained in the sediment sample collected from SB201 (Figure 3) • Sediment samples collected from locations SB201, SB202, SB203, and SB204 contained lead at concentrations that exceeded screening values. • Selenium was not detected in the sediment sample from SB202. • Zinc was detected at concentrations that exceeded benchmark screening values in sediment samples from locations SB201, SB202, and SB203. The maximum concentration of zinc was detected in the sample from SB201 (11,000 mg/kg). Concentrations of zinc that exceeded benchmark screening values detected in samples collected from SB202 (370 mg/kg) and SB203 (290 mg/kg) • With the exception of aluminum and beryllium, the maximum detected concentrations of inorganic chemicals were detected in surface sediment samples. • Lead was detected in all 60 sediment samples, lead concentrations ranged from 1.7 to 7,680 mg/kg • The Tidal Area ambient value for lead was exceeded in 31 samples. • Detailed results can be found in the RI and RI addendum report (Tetra Tech 2002; 2004).	• Groundwater samples were analyzed for pesticides, PCBs, VOCs, SVOCs, TPH, and one sample for dioxin. No SVOCs, pesticides, PCBs, or dioxins were detected in any of the groundwater samples. • No VOCs were detected in groundwater, except for trichloroethene (TCE). • TCE was detected in groundwater samples from all three wells ranging in concentration from .60 µg/L in wells GW01 and GW02 to 0.70 µg/L in GW03. Detected concentrations of TCE were only slightly greater than the detection limit of 0.50 µg/L. • An ambient water quality criteria value has not been established for TCE. • TPH-d was detected in the groundwater sample collected from well GW01 at a concentration of 0.10 mg/L. • TPH compounds were not detected in any other groundwater samples. There are currently no widely accepted screening criteria for TPH in groundwater. • Detailed results can be found in appendix G of the draft final RI addendum report (Tetra Tech 2004).	• Concentrations of aluminum exceeded the groundwater screening criterion (87 µg/L) in samples from all three monitoring wells. The maximum concentration (1,100 µg/L) was detected at monitoring well GW02. The concentration of aluminum detected in the duplicate sample collected at monitoring well GW02 was 560 µg/L. • Arsenic exceeded the groundwater screening criterion (36 µg/L) at all three monitoring wells. The maximum concentration (150 µg/L) was detected at monitoring well GW01. Arsenic was also detected at 60 µg/L at well GW03 and 37 µg/L at well GW02. • Copper slightly exceeded the groundwater screening criterion (3.1 µg/L) at monitoring wells GW02 and GW03. The maximum concentration (3.7 µg/L) was detected at GW02 in the duplicate sample. Copper also exceeded the screening criterion in the original sample from GW02 (3.4 µg/L). • Mercury (unspeciated) exceeded the groundwater screening criterion (0.025 µg/L) at monitoring well GW02 in both the original and duplicate sample. The maximum concentration (0.24 µg/L) was detected at GW02 in the duplicate sample. • Nickel exceeded the groundwater screening criterion (8.2 µg/L) at all three monitoring wells. The maximum concentration (17 µg/L) was detected at GW02. • Detailed results can be found in Appendix G of the draft final RI addendum report (Tetra Tech 2004)

Notes:

a Tetra Tech. 2002. "Draft Final Remedial Investigation for Taylor Boulevard Bridge Disposal Site, Tidal Area, NWS SB, Detachment Concord, January 31. 2002.

µg/L	Microgram per liter	TPH	Total petroleum hydrocarbons
mg/kg	Milligram per kilogram	TOC	Total organic scarbon
PCB	Polychlorinated biphenyls	TSS	Total suspended solids
RI	Remedial Investigation	VOCs	Volatile organic compound
SVOC	Semivolatile organic compound		

TABLE 3: CHEMICALS OF CONCERN
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Constituents of Potential Concern	Maximum Concentration Within Risk Footprint (mg/kg)	Maximum Concentration Outside Risk Footprint (mg/kg)	Concord Tidal Area Ambient 99th % UCL - Benthic Invertebrates (mg/kg)[b] -	Human Health Based Target Level in Soil (mg/kg)[b]	SF Bay Ambient (mg/kg)[b]	Ecological Receptors at Risk
Arsenic	142	24.8	27	26 [a]	15.6	Pickleweed, salt marsh harvest mouse, black-necked stilt, mallard
Cadmium	13.4	3.4	1.9	9.0	0.33	Black-necked stilt, mallard
Chromium	2,990	148	82.1	210	112	Human Health
Copper	12,500	199	81.0	2,900	68.1	Pickleweed, salt marsh harvest mouse, black-necked stilt, mallard, benthic invertebrates
Iron	378,000	-	-	23,000	-	Human Health
Lead	7,680	268	95.0	400	43.2	Salt marsh harvest mouse, black-necked stilt, mallard, benthic invertebrates
Mercury	26	1.5	0.32	-	0.43	Salt marsh harvest mouse, black-necked stilt, mallard
Selenium	12	7.6	Not Available	-	0.64	Pickleweed, salt marsh harvest mouse, black-necked stilt, mallard, benthic invertebrates
Zinc	11,000	609	264	-	158	Pickleweed, salt marsh harvest mouse, black-necked stilt, mallard, benthic invertebrates
Benzo(a)pyrene	0.6	-	-	0.8 [a]	412	Human health
Benzo(b)fluoranthene	2.0	-	-	0.6 [a]	-	Human health

Notes:

a Ambient concentration (Tetra Tech EM Inc. 1997. "Draft Technical Memorandum Estimation of Ambient Concentrations of Polynuclear Aromatic Hydrocarbons in Soil, Mare Island, Vallejo, California." July.)
b From RI addendum
mg/kg Milligram per kilogram

TABLE 4: DEVELOPMENT OF RISK FOOTPRINT

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Sample Location	Sample Date	Sample Depth (ft.)	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM	COBALT	COPPER	LEAD	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	THALLIUM	VANADIUM	ZINC	Total PCBs	Total PAHs	TPH Diesel	TPH Gasoline	TPH Motor Oil
Tidal Area Ambient[a]			27,300	2.2	27	530	0.18	1.9	82.1	36	81	95	1500	0.32	6.6	120	not available	not available	2.2	96	264	not available	not available	not available	not available	not available
SF Bay Ambient[b]			not available	not available	15.6	not available	not available	0.33	112	not available	68.1	43.2	not available	0.43	not available	112	0.64	0.58	not available	not available	158	0.0148	3.39	not available	not available	not available
ER-L[c]			not available	not available	8.2	not available	not available	1.2	81	not available	34	46.7	not available	0.15	not available	20.9	not available	1	not available	not available	150	0.0227	4.02	not available	not available	not available
ER-M[c]			not available	not available	70	not available	not available	9.6	370	not available	270	218	not available	0.71	not available	51.6	not available	3.7	not available	not available	410	0.18	44.79	not available	not available	not available
309SSCS	2/1/2000	0.00 - 0.50	12900	3.02 J	32.6	414	0.28	2.38 J	50.8 J	11.7	130 J	547	998	0.21	5.22 J	59.5 J	1.6	0.422	0.14 J	60.2	1980 J	NA	NA	NA	NA	NA
309SSNS	2/1/2000	0.00 - 0.50	14300	0.91 J	14.3	146	0.32	0.46 J	38.1 J	6.59	49 J	87.2	1520	0.22	3.09 J	40 J	2	0.26	0.14 J	57.4	89 J	NA	NA	NA	NA	NA
309SSSS	2/1/2000	0.00 - 0.50	13800	0.98 J	9.8	120	0.31	0.93 J	35.1 J	7.35	72.5 J	189	632	0.29	4.15 J	39 J	2	0.333	0.13 J	55.7	226 J	NA	NA	NA	NA	NA
309SB05	2/2/2000	0.00 - 0.50	10500	1.12 J	10.4	268	0.48	1.55 J	32.5 J	14.8	49 J	162	1940	0.26	0.47 J	43.2 J	0.6 UJ	0.563	0.17 J	35.7	284 J	NA	NA	NA	NA	NA
309SB106	2/2/2000	0.00 - 0.50	12400	0.37 J	7.7	175	0.4	0.31 J	29.4 J	8.88	21.7 J	268	422	0.05 UJ	0.31 J	36.2 J	0.3 UJ	0.131	0.11 J	40.1	71.2 J	NA	NA	NA	NA	NA
309CSPWSS	2/2/2000	0.00 - 0.50	7430	6.72 J	57	646	0.21	7.8 J	73.4 J	15.8	311 J	2300	1660	0.18	5.13 J	59.7 J	1.2	1.08	0.14 J	40.5 J	2270 J	NA	NA	NA	NA	NA
SB001	2/6/1996	0.00 - 0.50	6970	5.6 J	58.4	4660	0.03 U	0.56 U	136	23.4	608 J	2560	1200	0.42	9.7	58.6	0.65 U	5.4	5.3 U	14.2	4090	NA	3.9 U	33.0 J	33.0 J	33.0 J
SB001	2/6/1996	2.00 - 2.50	19000	0.59 UJ	7.6	87.3	0.6	0.07 U	46.3	9.1	33.6 J	22.6	328	0.09 U	0.24 U	41.3	0.84 U	0.36 U	0.7 U	49.7	85.3	NA	5.2 U	18.0 U	18.0 U	18.0 U
SB002	2/6/1996	0.00 - 0.50	6300	0.8 J	5.8	223	0.16	0.05 U	16.5	12.7	25.7 J	34.7	1480	0.06 U	0.54 U	27.8	0.59 U	0.13 U	1.4 U	26.3	89.5	NA	3.6 U	13.0 U	13.0 U	13.0 U
SB002	2/6/1996	2.00 - 2.50	9880	0.41 UJ	4.6	117	0.31	0.05 U	21.2	6.6	13.7 J	8	156	0.06 U	0.15 U	24.8	0.59 U	0.13 U	0.48 U	28.6	34.3	NA	3.6 U	13.0 U	13.0 U	13.0 U
SB003	2/6/1996	0.00 - 0.50	4570	84.2 J	142	765	0.03 UJ	5.5	125	22	6670 J	7680	987	26.4	18.1 J	262	0.6 UJ	2.3	2.5 UJ	31.3	3960	NA	3.5	550.0	550.0	550.0
SB003	2/6/1996	2.00 - 2.50	11600	0.4 UJ	3.1	278	0.33	0.05 U	23	9.5	12.7 J	6.5	414	0.06 U	0.15 U	32.9	0.57 U	0.12 U	0.47 U	30.1	32	NA	3.5 U	12.0 U	12.0 U	12.0 U
SB004	3/18/1997	0.00 - 0.50	4750	18.1 J	61.2 J	927	0.16 U	2.8 J	119	37.5	378 J	5030 J	1420	2.1	6	96.3	9 J	1.9 U	0.32 U	16.9	2100 J	NA	2.0	140.0 U	140.0 U	140.0 U
SB004	3/18/1997	1.00 - 1.50	7480	0.37 UR	2 J	387	0.55 J	0.07 UJ	17.4	5.8 J	12.3 UJ	6.4 J	312	0.08 U	0.74 U	27.3	0.84 UJ	1.8 U	0.28 U	22	18.8 J	NA	3.7 U	13.0 U	13.0 U	13.0 U
SB005	3/18/1997	0.00 - 0.50	4200	0.81 UJ	8.6 J	123	0.25 J	0.07 UJ	13.6	9.5 J	28.4 J	201 J	428	0.06 U	0.67 U	20.8	0.95 J	1.6 U	0.28 U	27.3	126 J	NA	2.5	120.0	120.0	120.0
SB005	3/18/1997	1.00 - 1.50	7840	0.37 UR	2.9 J	244	0.43 J	0.07 UJ	18.3	8.5 J	12.1 UJ	9.7 J	368	0.07 U	0.73 U	30.2	0.83 UJ	1.7 U	0.28 U	30.7	23.5 J	NA	3.5 U	12.0 U	12.0 U	12.0 U
SB006	3/18/1997	0.00 - 0.50	5400	0.71 UJ	6.2 J	115	0.35 J	0.06 UJ	15.6	8.3 J	20.1 J	66.9 J	415	0.09 U	0.64 U	23.2	0.74 J	1.5 U	0.26 U	30.2	42.1 J	NA	2.4	11.0 U	11.0 U	11.0 U
SB006	3/18/1997	1.00 - 1.50	12000	0.35 UJ	3.5 J	363	0.57 J	0.06 UJ	26.4	10.8	12.9 UJ	8.6 J	519	0.05 U	0.64 U	47.5	0.87 J	1.5 U	0.28 U	39.8	27.6 J	NA	3.3 U	12.0 U	12.0 U	12.0 U
SB007	3/18/1997	0.00 - 0.50	4040	0.95 UJ	6.1 J	124	0.3 J	0.06 UJ	20.5	20.5	30.5 J	184 J	367	0.19 U	0.65 U	72.2	0.96 J	1.5 U	0.24 U	27.8	120 J	NA	1.6	11.0 U	11.0 U	11.0 U
SB007	3/18/1997	1.00 - 1.50	9350	0.39 UJ	3 J	201	0.5 J	0.07 UJ	21.2	10.9 J	11.8 UJ	7.4 J	482	0.1 U	0.7 U	36.6	0.79 UJ	1.6 U	0.28 U	37.4	23 J	NA	3.3 U	12.0 U	12.0 U	12.0 U
SB008	3/18/1997	0.00 - 0.50	7860	1 UJ	10.2 J	236	0.47 J	0.07 UJ	30.4	9.8 J	39.1 J	129 J	425	0.09 U	0.84 J	49.8	0.76 UJ	1.6 U	0.26 U	35.2	98.9 J	NA	2.5	11.0 U	11.0 U	11.0 U
SB008	3/18/1997	1.00 - 1.50	11000	0.49 UJ	2.6 J	302	0.58 J	0.07 UJ	22.8	8.3 J	14.4 J	8.2 J	388	0.07 U	0.68 U	37.9	0.77 UJ	1.6 U	0.28 U	30.9	26 J	NA	3.4 U	12.0 U	12.0 U	12.0 U
SB009	3/18/1997	0.00 - 0.50	6360	6 J	37.8 J	391	0.22 J	3.3 J	43.1	19	327 J	1560 J	747	2.2	2.1	68.6	5 J	2.4 U	0.37 U	45.1	5410 J	NA	3.5	180.0 U	180.0 U	180.0 U
SB009	3/18/1997	1.00 - 1.50	6750	0.32 UR	4.9 J	149	0.41 J	0.06 UJ	16.6	10.1 J	13.9 J	7.8 J	156	0.08 U	0.64 U	24.7	0.72 UJ	1.5 U	0.3 U	39.6	21.5 J	NA	3.5 U	12.0 U	12.0 U	12.0 U
SB010	3/18/1997	0.00 - 0.50	4920	32.2 J	34 J	302	0.2 J	13.4 J	100	19.1	12500 J	1870 J	857	0.69	2.5	73.5	4 J	1.5 U	0.27 U	31.2	4960 J	NA	2.0	56.0 U	56.0 U	56.0 U
SB010	3/18/1997	1.00 - 1.50	8970	0.47 UJ	2.6 J	257	0.41 J	0.07 UJ	19.9	10.5 J	19 J	7.6 J	501	0.05 U	0.72 U	28.8	0.82 UJ	1.7 U	0.29 U	35.9	24 J	NA	3.6 U	13.0 U	13.0 U	13.0 U
SB011	3/18/1997	0.00 - 0.50	8090	0.66 UJ	14.7 J	210	0.33 J	0.08 UJ	29.7	10.2 J	50.2 J	318 J	544	0.11 U	0.75 U	40.3	1 J	1.8 U	0.29 U	34.6	154 J	NA	3.7 U	13.0 U	13.0 U	13.0 U
SB011	3/18/1997	1.00 - 1.50	9200	0.34 UR	2.4 J	90.2	0.45 J	0.07 UJ	20.3	7.5 J	12.4 U	6.1 J	364	0.08 U	0.68 U	28.3	0.77 UJ	1.6 U	0.29 U	25.4	19.5 J	NA	3.6 U	13.0 U	13.0 U	13.0 U
SB012	3/7/1997	0.00 - 0.50	5750	5 J	6.6 J	127	0.31 J	0.16 UJ	17.7	13.9	71.7 J	749 J	654	0.12 U	0.58 U	21.9	1.1 J	1.4 U	0.24 U	31.1	196 J	NA	2.3	11.0 U	11.0 U	11.0 U
SB012	3/18/1997	1.00 - 1.50	12900	0.37 UR	3.4 J	404	0.52 J	0.07 UJ	27.6	10.7 J	14.3 J	9.7 J	444	0.06 U	0.73 U	42.6	0.98 J	1.7 U	0.28 U	37	28.1 J	NA	3.5 U	12.0 U	12.0 U	12.0 U
SB013	10/13/1997	0.00 - 0.50	10700 J	2.5 J	19.7	680 J	0.02 U	0.1 UJ	45.4 J	11.1 UJ	1030 J	597 J	748 J	0.39	301	48.7 J	2.4	2.5	1.1 U	41.8	912 J	NA	NA	NA	NA	NA
SB014	10/13/1997	0.00 - 0.50	9350 J	6.4 J	61.4	1140 J	0.02 U	0.68 UJ	78 J	21.7	270 J	3280 J	1200 J	0.17 UJ	5	67.2 J	7.8	2.6	1.1 U	34.8	1660 J	NA	NA	NA	NA	NA
SB015	10/13/1997	0.00 - 0.50	7930 J	26.3 J	57.7	683 J	0.03 U	0.13 UJ	2990 J	14.4 J	726 J	1020 J	833 J	0.16 U	7.7	79.1 J	6.8	2.8 J	1.9 U	39.9	1540 J	NA	NA	NA	NA	NA
SB016	10/16/1997	0.00 - 0.25	4880 J	2.9 UJ	9.5 J	123 J	0.1 U	0.4 UJ	0.89 J	1.3 UJ	1.1 J	1.7 J	0.69 J	0.5 U	1.2 J	0.89 J	4 U	1.1 U	6 U	1.2 J	3.2 J	NA	NA	NA	NA	NA
SB017	10/13/1997	0.00 - 0.50	3 J	0.39 J	0.34	5.6 J	0.01 U	0.05 UJ	174 J	36.7	515 J	2030 J	1590 J	0.15 UJ	6.9	258 J	12	11.4 UJ	0.82 U	28.1	2060 J	NA	NA	NA	NA	NA
SB018	10/13/1997	0.00 - 0.50	3080 J	5.8 J	106	194 J	0.02 U	0.09 UJ	47.9 J	16.6	1670 J	1270 J	994 J	0.16 UJ	6.6	81.5 J	7.6	1.2 UJ	1.4 U	24.5	1130 J	NA	NA	NA	NA	NA
SB019	10/13/1997	0.00 - 0.50	3430 J	3.8 J	52.7	184 J	0.02 U	0.07 UJ	85 J	27.8	432 J	1640 J	1490 J	0.08 U	6	91.7 J	11.5	0.91 UJ	1.7 UJ	28.1	737 J	NA	NA	NA	NA	NA

TABLE 4: DEVELOPMENT OF RISK FOOTPRINT

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Sample Location	Sample Date	Sample Depth (ft.)	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM	COBALT	COPPER	LEAD	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	THALLIUM	VANADIUM	ZINC	Total PCBs	Total PAHs	TPH Diesel	TPH Gasoline	TPH Motor Oil
Tidal Area Ambient[a]			27,300	2.2	27	530	0.18	1.9	82.1	36	81	95	1500	0.32	6.6	120	not available	not available	2.2	96	264	not available	not available	not available	not available	not available
SF Bay Ambient[b]			not available	not available	15.6	not available	not available	0.33	112	not available	68.1	43.2	not available	0.43	not available	112	0.64	0.58	not available	not available	158	0.0148	3.39	not available	not available	not available
ER-L[c]			not available	not available	8.2	not available	not available	1.2	81	not available	34	46.7	not available	0.15	not available	20.9	not available	1	not available	not available	150	0.0227	4.02	not available	not available	not available
ER-M[c]			not available	not available	70	not available	not available	9.6	370	not available	270	218	not available	0.71	not available	51.6	not available	3.7	not available	not available	410	0.18	44.79	not available	not available	not available
SB020	10/13/1997	0.00 - 0.50	9650 J	2.7 J	22.9	336 J	0.02 U	0.06 UJ	74.6 J	12.2 UJ	1980 J	1180 J	591 J	0.64	2.9	126 J	4.2	0.9 UJ	0.91 U	39.2	1800 J	NA	NA	NA	NA	NA
SB100	2/11/1998	0.00 - 0.50	8450	5.6 UJ	6.2 J	111 J	0.16 U	0.48 U	27.6	7.8 J	54.9	97.2 J	1360	0.74 U	8 J	36.9 J	7.6 U	3.4 U	10.2 UJ	56.5 J	96	NA	NA	NA	NA	NA
SB101	2/11/1998	0.00 - 0.50	12600	1.9 UJ	8.9	56.8 J	0.17 UJ	0.16 U	30.9	4.8 J	39	67.9 J	330	0.28 U	2.6 J	35.8	2.5 U	1.1 U	3.4 UJ	43.1	65.7	NA	NA	NA	NA	NA
SB102	2/11/1998	0.00 - 0.50	11200	4.8 UJ	5.8 J	132 J	0.14 U	0.41 U	34.9	7.7 J	52.1	83.3 J	1900	0.75 U	3.7 J	37.4 J	6.9 J	2.9 U	8.7 UJ	53.3 J	87.9	NA	NA	NA	NA	NA
SB103	2/11/1998	0.00 - 0.50	8500	6.2 UJ	21.8	198 J	0.18 U	0.53 UJ	33.5	12.7 J	182	506 J	936	0.84 U	6.2 J	55.8 J	8.4 UJ	3.7 U	11.2 UJ	53.1 J	502	NA	NA	NA	NA	NA
SB104	2/11/1998	0.00 - 0.50	7630	3.8 UJ	3.9 U	114 J	0.11 U	0.33 U	23	6.5 J	50.5	68.2 J	1340	0.54 U	1.9 J	27.5 J	5.2 U	2.3 U	6.9 UJ	36.6 J	84.7	NA	NA	NA	NA	NA
SB105	2/11/1998	0.00 - 0.50	11900	0.92 UJ	5 UJ	205	0.026 U	0.079 U	14.8	12.8 J	37.1	24.9 J	327	0.12 U	0.4 U	23.2	1.2 U	0.55 U	2.1 J	62.2	74.3	NA	NA	NA	NA	NA
SB106	2/11/1998	0.00 - 0.50	17100	1.6 J	24.8	202	0.39 J	0.46 J	148	7.9 J	111	257 J	274	0.19 UJ	0.8 J	52.4	1.9 U	1.4 UJ	2.6 UJ	57.9	596	NA	NA	NA	NA	NA
SS200	6/8/1998	0.00 - 0.50	23300 J	1.4 R	18.8 J	133 J	0.49 J	0.94 J	53.3 J	8.7 J	91 J	163 J	471 J	0.24 U	2.2 J	68.8 J	1.7	0.35 U	3.4 J	80.5 J	358 J	NA	NA	NA	NA	NA
SS201	6/8/1998	0.00 - 0.50	9720 J	1.8 R	13.6 J	120 J	0.04 J	0.79 J	33.2 J	6.6 J	59.1 J	87.1 J	1410 J	0.37 U	4 J	38.6 J	2.4	0.46 J	3.5 J	48.5 J	94 J	NA	NA	NA	NA	NA
SS202	6/8/1998	0.00 - 0.50	10200 J	1.7 R	11.5 J	164 J	0.03 J	0.66 J	30.9 J	5.6 J	47 J	72.2 J	1570 J	0.31 U	2.3 J	33.4 J	1.7	0.45 J	2.6 J	46.1 J	107 J	NA	NA	NA	NA	NA
SS203	6/8/1998	0.00 - 0.50	12500 J	1.5 R	11.9 J	120 J	0.03 J	0.83 J	39.7 J	6.9 J	54.1 J	78.8 J	1060 J	0.26 U	4.1 J	41.4 J	1.4 J	0.37 U	1.9 J	62.9 J	205 J	NA	NA	NA	NA	NA
SS204	6/8/1998	0.00 - 0.50	13300 J	1.8 R	15.7 J	131 J	0.04 J	3.4 J	38.2 J	10.9 J	199 J	165 J	830 J	1.5	4.1 J	49.5 J	1.3 J	1.5 J	2.4 J	53.4 J	609 J	NA	NA	NA	NA	NA
SS205	6/8/1998	0.00 - 0.50	1890 J	2.1 J	26.8 J	67.4 J	0.02 J	2.4 J	15.2 J	5.6 J	166 J	378 J	311 J	0.17 U	3 J	25.9 J	0.69 UJ	0.62 J	2.5 J	20.3 J	4980 J	NA	NA	NA	NA	NA
SS206	6/8/1998	0.00 - 0.50	5410 J	1.2 J	7.7 J	215 J	0.02 UJ	1.6 J	28.9 J	9.6 J	565 J	486 J	321 J	0.05 U	0.67 J	229 J	0.2 U	6.7	1.6 J	16.8 J	983 J	NA	NA	NA	NA	NA
SS207	6/8/1998	0.00 - 0.50	5200 J	0.64 R	3.2 J	72.4 J	0.01 J	0.26 UJ	12.9 J	4.3 J	17.4 J	34.6 J	712 J	0.11 U	0.42 J	16.2 J	0.47 J	0.17 UJ	1.7 J	22.8 J	58.8 J	NA	NA	NA	NA	NA
SS208	6/8/1998	0.00 - 0.50	6440 J	0.34 R	3.9 J	90.2 J	0.16 UJ	0.27 UJ	12.4 J	6 J	12.2 J	50.2 J	240 J	0.05 U	0.1 J	15.5 J	0.2 U	0.09 U	0.96 J	24.5 J	61.6 J	NA	NA	NA	NA	NA
SS209	6/8/1998	0.00 - 0.50	6870 J	1.4 J	10.9 J	266 J	0.03 J	1.1 J	20.6 J	6.7 J	73 J	85 J	2480 J	0.2 U	4.5 J	31.2 J	2.4	0.58 J	3.5 J	37.2 J	175 J	NA	NA	NA	NA	NA
SS210	6/8/1998	0.00 - 0.50	8880 J	0.29 R	4.7 J	110 J	0.11 UJ	0.38 J	23.3 J	6.1 J	13.3 J	29.8 J	285 J	0.05 U	0.09 J	23.9 J	0.21 J	0.09 UJ	1.2 J	25.2 J	70.4 J	NA	NA	NA	NA	NA
SS211	6/8/1998	0.00 - 0.50	7750 J	0.29 R	3.1 J	125 J	0.17 UJ	0.25 UJ	16.4 J	5.4 J	9.2 J	44.5 J	233 J	0.04 U	0.09 J	20.4 J	0.18 U	0.1 UJ	0.94 J	19.6 J	46.5 J	NA	NA	NA	NA	NA
SS212	6/8/1998	0.00 - 0.50	7920 J	0.6 J	3.1 J	91.2 J	0.01 J	0.36 J	31.2 J	8.5 J	19.6 J	56.3 J	383 J	0.05 U	0.08 J	39 J	0.17 U	0.09 UJ	1.2 J	29.5 J	104 J	NA	NA	NA	NA	NA
SS213	6/8/1998	0.00 - 0.50	8520 J	0.28 R	7.4 J	118 J	0.14 UJ	0.69 J	24.1 J	6.1 J	57.1 J	110 J	251 J	0.25	0.08 J	48 J	0.17 U	0.15 UJ	0.81 J	21 J	337 J	NA	NA	NA	NA	NA
SS214	6/8/1998	0.00 - 0.50	7080 J	0.44 J	8.1 J	88.2 J	0.01 UJ	0.38 J	24 J	7.3 J	17.5 J	195 J	311 J	0.08 UJ	0.1 J	37.9 J	0.17 J	0.08 UJ	0.83 J	25.9 J	79 J	NA	NA	NA	NA	NA
SB201	11/24/2003	4.0 - 5.0	16000	92.0 J	33.0	2900	0.250 J	6.1 J	77.0	9.7	740	570 J	590	0.270	7.6	65.0 J	1.2	0.710 J	3.0 J	72.0	11000	0.155 U	2.7 U	12.0	3.4 U	47.0
SB202	11/24/2003	3.0 - 4.0	17000	NA	11	200	0.390 J	1.1 UJ	44.0	4.0 J	92.0	240 J	270	0.083	3.7 J	40.0 J	1.1 U	1.1 U	1.1 U	55.0	370	0.200 U	3.5 U	18.0	4.5 U	63.0
SB203	11/24/2003	3.75 - 4.75	18000	NA	8.7	120	0.460 J	0.790 J	46.0	3.9 J	140.000	180 J	380	0.360	3.3 J	40.0 J	1.0 J	1.3 U	1.3 U	63.0	290	0.263 U	4.6 U	23.0	5.7 U	110.0
SB204	11/24/2003	2.0 - 3.0	11000	NA	13.0	98	0.550	0.310 UJ	24.0	8.3	30.0	100 J	260	0.033 UJ	1.2 U	24.0 J	0.310 U	0.310 U	0.460 UJ	34.0	110	0.064 U	1.1 U	1.3 U	1.4 U	17.0
SB205	11/24/2003	2.0 - 3.0	13000	NA	2.9	140	0.530	0.330 UJ	23.0	9.3	13.0	8.0 J	440	0.029 UJ	1.3 U	35.0 J	0.330 U	0.330 U	0.330 U	26.0	26	0.057 U	1.0 U	1.2 U	1.2 U	6.1

Units shown in milligrams per kilogram

ER-L Effects-range low

ER-M Effects-range median

NA Not Analyzed

PAH Polynuclear aromatic hydrocarbons

PCB Polychlorinated biphenyls

U - Non-detected concentration

J - Estimated concentration

Sample location falls within the risk footprint

Sample location is outside the risk footprint but is included in the excavation footprint

No Shading Outside risk and excavation footprint

a Tetra Tech. 2002. "Draft Final Remedial Investigation for Taylor Boulevard Bridge Disposal Site, Tidal Area, NWS SB, Detachment Concord, Appendix E." January 31.

b RWQCB. 1998. "Ambient Concentrations of Toxic Chemicals in Sediments." April.

c Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. "Incidence of Adverse Biological Effects within Ranges Of Chemical Concentrations

TABLE 5: SUMMARY OF REMOVAL ALTERNATIVES
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Removal Action Components[1]	Estimated Duration	Removal Action Alternatives			
		1	2	3	4
Preconstruction Activities					
Railroad Permit	6 months			●	●
Haul road construction	1 week			●	●
Mobilize equipment (wetlands)	1 day			●	●
Locate underground utilities	1 day			●	●
Installation of mouse fence and trapping by biological monitor	1 week			●	●
Install Aqua Barriers	2 days			●	●
Abandon wells	2 days			●	●
Excavation of Debris & Disposal Cell Construction					
Excavation/Dewatering of soil disposal cell	4 weeks			●	
Installation of soil disposal cell sheet pile walls	2 days			●	
Dewater excavation footprint	4 weeks			●	●
Excavation of contaminated soil and debris	4 Weeks			●	●
Confirmation sampling	4 weeks			●	●
Transportation and disposal of stabilized soil and debris onsite	4 weeks			●	
Installation of disposal cell cover	4 weeks			●	
Transportation and disposal of contaminated soil and debris off-site	4 weeks				●

TABLE 5: SUMMARY OF REMOVAL ALTERNATIVES (CONTINUED)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Removal Action Components[1]	Estimated Duration	Removal Action Alternatives			
Post Construction Activities					
Wetlands restoration[2]	1-3 Years			●	●
Groundwater monitoring downgradient of disposal cell	1-3 Years			●	
Remove temporary railroad crossing	2 days			●	●
Demobilize equipment	2 days			●	●
Land use controls	Indefinite			●	
Monitoring	Alternative 2 (30 Years) Alternatives 3 and 4 (3 Years)		●	●	●

Notes:
1. Certain components will occur in parallel with others.
2. Includes time to reestablish pickleweed habitat.

TABLE 6: REMOVAL ACTION ALTERNATIVES COMPARATIVE ANALYSIS
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Criterion	Alternative 1: No Action Comment	Alternative 2: Monitoring Comment	Alternative 3: Excavation, On-Site Disposal, Land Use Controls and Habitat Restoration Comment	Alternative 4: Excavation, Off-Site Disposal, and Habitat Restoration Comment
Effectiveness				
1. Overall Protection of Human Health and the Environment	Alternative 1 will not eliminate, reduce, or control the potential human health or ecological risk presented by contaminated soils and sediments at Site 30.	Alternative 2 will not eliminate, reduce, or control the potential human health or ecological risk presented by contaminated soils and sediments at Site 30.	Alternative 3 is protective of human health and the environment by reducing the exposure to COPCs and COECs through removal, stabilization, and containment of soils and debris. Land use controls may be required for the on-site disposal cell.	Alternative 4 is protective of human health and the environment by reducing the exposure to COPCs and COECs through removal and off-site disposal of soils, sediments, and debris.
2. Compliance with ARARs	No action- or location-specific ARARs apply to this alternative.	No action- or location-specific ARARs apply to this alternative.	Alternative 3 can be designed to meet all chemical-, location-, and action-specific ARARs.	Alternative 4 can be designed to meet all chemical-, location-, and action-specific ARARs.
3. Long-term Effectiveness and Permanence	Alternative 1 does not assure long-term effectiveness and permanence.	Alternative 2 does not assure long-term effectiveness and permanence.	Alternative 3 is moderately effective in the long term. Environmental conditions may affect long-term containment mobility. Annual monitoring for 3 to 5 years may be required to document the successful revegetation of the wetland habitat.	Alternative 4 is effective in the long term. Residual risks will be permanently reduced to within acceptable levels by removing all affected soils, sediments, and debris. Annual monitoring for 3 to 5 years may be required to document the successful revegetation of the wetland habitat.
4. Reduction in Toxicity, Mobility, and Volume through Treatment	The mobility, toxicity and volume of hazardous substances at Site 30 will not be reduced under Alternative 1 because the contaminated soils, sediments, and debris will not be removed or treated.	The mobility, toxicity and volume of hazardous substances at Site 30 will not be reduced under Alternative 2 because the contaminated soils, sediments, and debris will not be removed or treated.	Alternative 3 will effectively reduce the toxicity and mobility, but not the volume, of the waste through on-site treatment.	Alternative 4 will effectively reduce the toxicity and mobility, but not the volume, of the waste through off-site landfilling.
5. Short-term Effectiveness	Alternative 1 will not achieve the RAO for soils under the unrestricted land use scenario or the ecological RAOs. Alternative 1 is not considered effective in the short term.	Alternative 2 will not achieve the RAO for soils under the unrestricted land use scenario or the ecological RAOs. Monitoring will be in place for 30 years under this alternative. Alternative 2 is not considered effective in the short term.	Alternative 3 is effective in the short term. Excavation will have a temporary impact on the wetland habitat. Alternative 2 will require approximately 2 months to implement.	Alternative 4 is moderately highly effective in the short term. The community is far removed from the site and so is unlikely to face any short-term risks during excavation and removal. Excavation will have a temporary impact on the wetland habitat. Alternative 3 will require approximately 1 month to implement.
Implementability				
6. Technical Feasibility and Commercial Availability	Readily implementable. No construction or administrative activities will be required to implement this alternative.	Readily implementable. Minimal construction or administrative activities will be required to implement this alternative. A qualified biologist or environmental scientist would conduct monitoring.	Moderately implementable. Alternative 3 is considered of low to medium in complexity based on the technical and administrative challenges associated with the alternative. However, resources required to complete associated remedial activities are available.	Moderately implementable. Alternative 4 is considered low to medium in complexity based on the technical and administrative challenges associated with the alternative. However, resources required to complete associated remedial activities are available.
COST				
7. Estimated Cost	$0	$382,000	$2.1 million	$1.9 million

TABLE 7: RELATIVE RANKING OF REMOVAL ACTION ALTERNATIVES

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Taylor Boulevard Bridge Disposal Site				
Evaluation Criteria	**Alternative 1 No Action**	**Alternative 2 Monitoring**	**Alternative 3 Excavation, Stabilization, On-Site Disposal, LUCs, and Habitat Restoration**	**Alternative 4 Excavation, Off-Site Disposal, and Habitat Restoration**
Overall Protection of Human Health and the Environment	5	5	2	1
Compliance with ARARs	5	5	3	1
Long-Term Effectiveness	5	5	3	1
Reduction of Toxicity, Mobility, Volume	5	5	3	2
Short-Term Effectiveness	5	5	2	3
Implementability	1	1	3	2
Cost	1	1	3	3
State Acceptance (estimated)	5	5	2	1
Community Acceptance (estimated)	5	5	2	1
Sum	**37**	**37**	**23**	**15**
Overall Rating	**4**	**4**	**2**	**1**

Ranking Scale:

1 Meets Criteria Best

5 Meets Criteria Least

Notes:

ARAR Applicable or Relevant and Appropriate Requirement

LUC Land use control

TABLE 8: COST ESTIMATE SUMMARY FOR REMOVAL ACTION ALTERNATIVES
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Alternative	Capital Cost	Annual O&M Cost [a]	Periodic Cost	Total NPV Cost [b]
1 – No Action	$0	$0	$0	$0
2 – Monitoring	$60,000	$305,000	$17,000	$382,000
3 – Excavation, Stabilization, On-site Disposal, LUCs and Habit Restoration	$1,704,000	$358,000	$16,000	$2,078,000
4 – Excavation, Off-site Disposal, and Habitat Restoration	$1,820,000	$7,000	$46,000	$1,873,000

Notes:

a Annual O&M costs including monitoring for the first 5 years.

b Total NPV cost includes capital costs and NPV of annual O&M cost. Present value calculated based on a 7 percent discount rate for 30 years.

LUC Land use control

O&M Operation and Maintenance

NPV Net present value

APPENDIX A
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CONTENTS

CONTENTS (Continued)

TABLES

ACRONYMS AND ABBREVIATIONS

§	Section
§§	Sections
AOC	Area of contamination
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
CCR	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COEC	Chemical of ecological concern
ch.	ChapterCOPC Chemical of potential concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DOT	U.S. Department of Transportation
DQW	Department of Water Quality
DTSC	Department of Toxic Substances Control
EE/CA	Engineering evaluation and cost analysis
ELCR	Excess lifetime cancer risk
EP	Extraction procedure
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
HSWA	Hazardous and Solid Waste Amendments
LDR	Land disposal restrictions
mg/L	Milligram per liter
mg/kg	Milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NWS SBD	Naval Weapons Station Seal Beach Detachment
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
ROD	Record of decision
RWQCB	California Regional Water Quality Control Board

SDWA	Safe Drinking Water Act
STLC	Soluble threshold limit concentration
SWRCB	State Water Resources Control Board
TBB Disposal Site	Taylor Bridge Boulevard Disposal Site
TBC	To be considered
TCLP	Toxicity characteristic leaching procedure
TDS	Total dissolved solids
TSCA	Toxic Substances Control Act
TTLC	Total threshold limit concentration
USACE	U.S. Army Corps of Engineers
U.S.C.	*United States Code*
WET	Waste extraction test

1.0 INTRODUCTION

This appendix identifies and evaluates potential federal and State of California applicable or relevant and appropriate requirements (ARARs) from the universe of regulations, requirements, and guidance and sets forth the U.S. Department of Navy determinations regarding potential ARARs for each response action alternative retained for detailed analysis in this engineering evaluation/cost analysis (EE/CA) report for Installation Restoration Site 30, the Taylor Bridge Boulevard Disposal Site (TBB Disposal Site) at Naval Weapons Station Seal Beach Detachment (NWS SBD) Concord, located in Concord, California.

This ARAR evaluation includes an initial determination of whether the potential ARARs actually qualify as ARARs and a comparison for stringency between the federal and state regulations to identify controlling ARARs. The identification of ARARS is an iterative process. The final determination of ARARs will be made by the Navy in the action memorandum (AM) record of decision (ROD) after public review as part of the response action selection process.

1.1 SUMMARY OF CERCLA AND NCP REQUIREMENTS

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 United States Code [U.S.C.] Section [§] 9621[d]), as amended, states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate. Although Section 121 of CERCLA does not itself expressly require that CERCLA removal actions comply with ARARs, the U.S. Environmental Protection Agency (EPA) has promulgated a requirement in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) mandating that CERCLA removal actions "shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (Title 40 Code of Federal Regulations [CFR] § 300.415[j]) (40 CFR § 300.415[j]). It is Navy policy to follow this requirement. Certain specified waivers may be used for removal actions, as is the case with remedial actions.

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. The requirement is applicable if the jurisdictional prerequisites of the standard show a direct correspondence when objectively compared with the conditions at the site. An applicable federal requirement is an ARAR. An applicable state requirement is an ARAR only if it is more stringent than federal ARARs.

If the requirement is not legally applicable, then the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed response action and are well suited to the conditions of the site (EPA 1988). A requirement must be determined to be both relevant and appropriate in order to be considered an ARAR.

The criteria for determining relevance and appropriateness are listed in 40 CFR § 300.400(g)(2) and include the following:

- The purpose of the requirement and the purpose of the CERCLA action
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site
- The substances regulated by the requirement and the substances found at the CERCLA site
- The actions or activities regulated by the requirement and the response action contemplated at the CERCLA site
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site
- The type of place regulated and the type of place affected by the release or CERCLA action
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site

According to CERCLA ARARs guidance (EPA 1988), a requirement may be "applicable" or "relevant and appropriate," but not both. Identification of ARARs must be done on a site-specific basis and involve a two-part analysis: first, a determination whether a given requirement is applicable; then, if it is not applicable, a determination whether it is nevertheless both relevant and appropriate. It is important to explain that some regulations may be applicable or, if not applicable, may still be relevant and appropriate. When the analysis determines that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable (EPA 1988).

Tables A-1, A-2, and A-3 in this appendix present each potential ARAR with an initial determination of ARAR status (applicable or relevant and appropriate). For the determination of relevance and appropriateness, the pertinent criteria were examined to determine whether the requirements addressed problems or situations sufficiently similar to the circumstances of the release or response action contemplated, and whether the requirement was well suited to the site.

To qualify as a state ARAR under CERCLA and the NCP, a state requirement must be:

- A state law or regulation
- An environmental or facility siting law or regulation

- Promulgated (of general applicability and legally enforceable)
- Substantive (not procedural or administrative)
- More stringent than federal requirements
- Identified in a timely manner
- Consistently applied

To constitute an ARAR, a requirement must be substantive. Therefore, only the substantive provisions of requirements identified as ARARs in this analysis are considered to be ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or nonenvironmental, including permit requirements, are not considered to be ARARs. CERCLA § 121(e)(1), 42 U.S.C. § 9621(e)(1), states, "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section." The term *on-site* is defined for purposes of this ARARs discussion as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (40 CFR § 300.5).

Nonpromulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. Such requirements may, however, be useful, and are "to be considered" (TBC). TBC (40 CFR § 300.400[g][3]) requirements complement ARARs but do not override them. They are useful for guiding decisions regarding cleanup levels or methodologies when regulatory standards are not available.

Pursuant to EPA guidance (EPA 1988), ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific requirements. This classification was developed to aid in the identification of ARARs; some ARARs do not fall precisely into one group or another. ARARs are identified on a site basis for remedial actions where CERCLA authority is the basis for cleanup.

As the lead federal agency at, the Navy has primary responsibility for identifying federal ARARs at the TBB Disposal Site. Pursuant to the definition of the term "on-site" in 40 CFR § 300.5, the on-site areas part of this action include the TBB Disposal Site.

1.2 METHODOLOGY DESCRIPTION

The process of identifying and evaluating potential federal and state ARARs is described in this subsection.

1.2.1 General

As the lead federal agency, the Navy has primary responsibility for identification of potential ARARs for the TBB Disposal Site. In preparing this ARARs analysis, the Navy undertook the following measures consistent with CERCLA and the NCP:

- Identified federal ARARs for each response action alternative addressed in the EE/CA taking into account site-specific information for the TBB Disposal Site
- Reviewed potential state ARARs identified by the state to determine whether they satisfy CERCLA and NCP criteria that must be met in order to constitute state ARARs
- Evaluated and compared federal ARARs and their state counterparts to determine whether state ARARs are more stringent than the federal ARARs or are in addition to the federally required actions
- Reached a conclusion as to which federal and state ARARs are the most stringent and/or "controlling" ARARs for each alternative.

The removal action objectives for contaminated soil at TBB Disposal Site are as follows:

- Promote overall protection of human health and the environment
- Restrict the potential for humans and other ecological receptors to contact chemical- or solid waste-contaminated soil near the ground surface within the TBB site.

The alternatives developed and evaluated in this EE/CA are designed to accomplish these removal action objectives. The alternatives retained for detailed analysis in this EE/CA are:

Alternative 1: No Action

Alternative 2: Monitoring

Alternative 3: Excavation, Stabilization, On-site Disposal, Land Use Controls, and Habitat Restoration

Alternative 4: Excavation, Off-site Disposal and Habitat Restoration

1.2.2 Identifying and Evaluating Federal ARARs

The Navy is responsible for identifying federal ARARs as the lead federal agency under CERCLA and the NCP. The final determination of federal ARARs will be made when the Navy issues the AM for TBB Disposal Site. The federal government implements a number of federal environmental statutes that are the source of potential federal ARARs, either in the form of the statutes or regulations promulgated thereunder. Examples include the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Toxic Substances Control Act (TSCA), and their implementing regulations, to name a few. See the preamble to the NCP at 55 *Federal Register* (FR) 8764–8765 (1990) for a more complete listing.

The proposed response actions and alternatives were reviewed against all potential federal ARARs, including, but not limited to, those set forth at 55 FR 8764–8765 (1990) to determine if they are applicable or relevant and appropriate utilizing the CERCLA and NCP criteria and procedures for ARARs identification by lead federal agencies.

1.3 OTHER GENERAL ISSUES

General issues identified during the evaluation of ARARs for the TBB Disposal Site are discussed in the following subsections.

1.3.1 General Approach to Requirements of the Federal Resource Conservation and Recovery Act

RCRA is a federal statute passed in 1976 to meet four goals: protection of human health and the environment; reduction of waste; conservation of energy and natural resources; and elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. RCRA, as amended, contains several provisions that are potential ARARs for CERCLA sites.

Substantive RCRA requirements are applicable to response actions on CERCLA sites if the waste is a RCRA hazardous waste, and either

- The waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement; or
- The activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA (EPA 1988).

The preamble to the NCP indicates that state regulations that are components of a federally authorized or delegated state program are generally considered federal requirements and potential federal ARARs for the purposes of ARARs analysis (55 FR 8666, 8742 [1990]). The State of California received approval for its base RCRA hazardous waste management program on July 23, 1992 (57 FR 32726 [1992]). The California "Environmental Health Standards for the Management of Hazardous Waste," set forth in Title 22 *California Code of Regulations*, Division 4.5 (CCR Title 22, Division 4.5), were approved by EPA as a component of the federally authorized state of California RCRA program. On September 26, 2001, California received final authorization of its revised State Hazardous Waste Management Program by the EPA (63 FR 49118 [2001]).

The regulations of CCR Title 22, Division 4.5 are, therefore, a source of potential federal ARARs for CERCLA response actions. The exception is when a state regulation is "broader in scope" than the corresponding federal RCRA regulations. In that case, the regulations are not considered part of the federally authorized program or potential federal ARARs. Instead, they are purely state law requirements and potential state ARARs.

The EPA July 23, 1992, notice approving the State of California RCRA program (57 FR 32726 [1992]) specifically indicated that the state regulations addressed certain non-RCRA, state-regulated hazardous wastes that fell outside the scope of federal RCRA requirements. CCR Title 22, Division 4.5, requirements would be potential state ARARs for these non-RCRA, state-regulated wastes.

A key threshold question for the ARARs analysis is whether or not the contaminants at TBB Disposal Site constitute federal hazardous waste as defined under RCRA and the state's authorized program or qualify as non-RCRA, state-regulated hazardous waste. Waste characterization is discussed below in Section 1.4.

1.4 WASTE CHARACTERIZATION

Selection of ARARs involves the characterization of wastes as described below. This section discusses RCRA hazardous waste determination, California-regulated, non-RCRA hazardous waste determination, and other California waste classifications.

1.4.1 RCRA Hazardous Waste Determination

Federal RCRA hazardous waste determination is necessary to determine whether a waste is subject to RCRA requirements at CCR Title 22, Division 4.5 and other state requirements at CCR Title 23, Division 3, Chapter (Chapter) 15. The first step in the RCRA hazardous waste characterization process is to evaluate contaminated media at the site and determine whether the contaminant constitutes a "listed" RCRA waste. The preamble to the NCP states that "it is often necessary to know the origin of the waste to determine whether it is a listed waste and that, if such documentation is lacking, the lead agency may assume it is not a listed waste" (55 FR 8666, 8758 [1990]).

This approach is confirmed in EPA guidance for CERCLA compliance with other laws (EPA 1988) as follows:

> "To determine whether a waste is a listed waste under RCRA, it is often necessary to know the source. However, at many Superfund sites, no information exists on the source of wastes. The lead agency should use available site information, manifests, storage records, and vouchers in an effort to ascertain the nature of these contaminants. When this documentation is not available, the lead agency may assume that the wastes are not listed RCRA hazardous wastes, unless further analysis or information becomes available that allows the lead agency to determine that the wastes are listed RCRA hazardous wastes."

RCRA hazardous wastes that have been assigned EPA hazardous waste numbers (or codes) are listed in CCR Title 22, Sections (§§) 66261.30–66261.33. The lists include hazardous waste codes beginning with the letters "F," "K," "P," and "U."

Knowledge of the exact source of a waste is required for source-specific listed wastes ("K" waste codes). Some knowledge of the nature or source of the waste is required even for listed wastes from nonspecific sources, such as spent solvents ("F" waste codes) or commercial chemical products ("P" and "U" waste codes). These listed RCRA hazardous wastes are restricted to commercially pure chemicals used in particular processes such as degreasing.

"P" and "U" wastes cover only unused and unmixed commercial chemical products, particularly spilled or off-specification products (EPA 1991). Not every waste containing a "P"- or "U"-listed chemical is a hazardous waste. There must be direct evidence of product use to determine whether a CERCLA investigation-derived waste contains a "P" or "U" waste. In particular, all the following criteria must be met. The chemicals must be:

- Discarded (as described in 40 CFR § 261.2[a][2]),
- Either an off-specification commercial product or a commercially sold grade,
- Not used (soil contaminated with spilled unused wastes is a "P "or "U" waste), and
- The sole active ingredient in a formulation.

The second step in the RCRA hazardous waste characterization process is to evaluate potential hazardous characteristics of the waste. The evaluation of characteristic waste is described in EPA guidance as follows (EPA 1988):

> "Under certain circumstances, although no historical information exists about the waste, it may be possible to identify the waste as RCRA characteristic waste. This is important in the event that (1) remedial alternatives under consideration at the site involve on-site treatment, storage, or disposal, in which case RCRA may be triggered as discussed in this section; or (2) a remedial alternative involves off-site shipment. Since the generator (in this case, the agency or responsible party conducting the Superfund action) is responsible for determining whether the wastes exhibit any of these characteristics (defined in 40 CFR §§ 261.21–261.24), testing may be required. The lead agency must use best professional judgment to determine, on a site-specific basis, if testing for hazardous characteristics is necessary.
>
> In determining whether to test for the toxicity characteristic using the extraction procedures (EP) toxicity test, it may be possible to assume that certain low concentrations of waste are not toxic. For example, if the total waste concentration in soil is 20 times or less the EP toxicity concentration, the waste cannot be characteristic hazardous waste. In such a case, RCRA requirements would not be applicable. In other instances, where it appears that the substances may be characteristic hazardous waste (ignitable, corrosive, reactive, or EP toxic), testing should be performed."

Hazardous waste characteristics as defined in 40 CFR §§ 261.21–261.24 are commonly referred to as ignitability, corrosivity, reactivity, and toxicity. California environmental health standards for the management of hazardous waste set forth in CCR Title 22, Division 4.5, were approved by

EPA as a component of the federally authorized California RCRA program. Therefore, characterization of RCRA waste is based on the state requirements.

The characteristics of ignitability, corrosivity, reactivity, and toxicity are defined in CCR Title 22, §§ 66261.21–66261.24. According to CCR Title 22, § 66261.24(a)(1)(A), "A waste that exhibits the characteristic of toxicity pursuant to subsection (a)(1) of this section has the EPA Hazardous Waste Number specified in Table I of this section which corresponds to the toxic contaminant causing it to be hazardous." Table I assigns hazardous waste codes beginning with the letter "D" to wastes that exhibit the characteristic of toxicity; D waste codes are limited to "characteristic" hazardous wastes.

According to CCR Title 22, § 66261.10, waste characteristics can be measured by an available standardized test method or be reasonably classified by generators of waste based on their knowledge of the waste provided that the waste has already been reliably tested or if there is documentation of chemicals used

The requirements at CCR Title 22, § 66261.24, list the toxic contaminant concentrations that determine the characteristic of toxicity. The concentration limits are in milligrams per liter (mg/L). These units are directly comparable to total concentrations in waste groundwater and surface water. For waste soils, these concentrations apply to the extract or leachate produced by the toxicity characteristic leaching procedure (TCLP).

A waste is considered hazardous if the contaminants in the wastewater or in the soil TCLP extract equal or exceed the TCLP limits. TCLP testing is required only if total contaminant concentrations in soil equal or exceed 20 times the TCLP limits because TCLP uses a 20-to-1 dilution for the extract (EPA 1988).

1.4.2 California-Regulated, Non-RCRA Hazardous Waste

A waste determined not to be a RCRA hazardous waste may still be considered a state-regulated, non-RCRA hazardous waste. The state is broader in scope in its RCRA program in determining hazardous waste. CCR Title 22, § 66261.24(a)(2), lists the total threshold limit concentrations (TTLC) and soluble threshold limit concentrations (STLC) for non-RCRA hazardous wastes. The state applies its own leaching procedure, the waste extraction test (WET), which uses a different acid reagent and has a different dilution factor (10-fold). There are other state requirements that may be broader in scope than federal ARARs for identifying non-RCRA wastes regulated by the state. These may be potential ARARs for wastes not covered under federal ARARs. See additional subsections of CCR Title 22, § 66261.24. A waste is considered hazardous if its total concentrations exceed the TTLCs or if the extract concentrations from the WET exceed the STLCs.

A WET is required when the total concentrations exceed the STLC but are less than the TTLCs (CCR Title 22, Division 4.5, Chapter 11, Appendix [app.] II [b]).

1.4.3 Other California Waste Classifications

For waste discharged after July 18, 1997, solid waste classifications at CCR Title 27, §§ 20210, 20220, and 20230 are used to determine applicability of waste management requirements. These classifications are summarized below.

A "designated waste" under CCR Title 27, § 20210, is defined at California Water Code, § 13173. Under California Water Code, § 13173, designated waste is hazardous waste that has been granted a variance from hazardous waste management requirements or nonhazardous waste that consists of or contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state.

A nonhazardous solid waste under CCR Title 27, § 20220, consists of all putrescible and nonputrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid wastes, and other discarded waste (whether of solid or semisolid consistency), provided that such wastes do not contain wastes that must be managed as hazardous wastes or wastes that contain soluble pollutants in concentrations that exceed applicable water quality objectives or could cause degradation of waters of the state.

Under CCR Title 27, § 20230, inert waste is that subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives and does not contain significant quantities of decomposable waste.

2.0 CHEMICAL-SPECIFIC ARARs

Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of a cleanup level. Many potential ARARs associated with particular response alternatives (such as closure or discharge) can be characterized as action-specific but include numerical values or methodologies to establish them so they fit in both categories (chemical- and action-specific). To simplify the comparison of numerical values, most action-specific requirements that include numerical values are included in this chemical-specific section and, if repeated in the action-specific section, the discussion refers back to this section.

This section presents chemical-specific ARAR determinations for soil. Table A-1 summarizes potential chemical-specific ARARs and TBCs.

2.1 SOIL ARARS

2.1.1 Federal Requirements

The only ARARs for soils that apply to the TBB Disposal Site are the RCRA hazardous waste characterization requirements. There are no other chemical-specific ARARs for soil. The Navy has determined that the action level for lead within the footprint of the debris will be 268 milligrams per kilogram (mg/kg). This is the maximum concentration of lead outside of the risk footprint for which there was no ecological or human health risk.

The key threshold question for soil ARARs is whether or not the wastes located at the TBB Disposal Site would be classified as hazardous waste. The soil may be classified as a federal hazardous waste as defined by RCRA and the state-authorized program, or as non-RCRA, state regulated hazardous waste. If the soil is determined to be hazardous waste, the appropriate requirements will apply.

The federal RCRA requirements at 40 CFR Part 261 do not apply in California because the state RCRA program is authorized. The authorized state RCRA requirements are therefore considered potential federal ARARs. The applicability of RCRA requirements depends on whether the waste is a RCRA hazardous waste; whether the waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement; and whether the activity at the site constitutes treatment, storage, or disposal as defined by RCRA. However, RCRA requirements may be relevant and appropriate even if they are not applicable. Examples include activities that are similar to the definition of RCRA treatment, storage, or disposal for waste that is similar to RCRA hazardous waste.

The determination of whether a waste is an RCRA hazardous waste can be made by comparing the site waste to the definition of RCRA hazardous waste. The RCRA requirements at CCR Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100, are potential ARARs because they define RCRA hazardous waste. A waste can meet the definition of hazardous waste if it has the toxicity characteristic of hazardous waste. This determination is made by using the TCLP. The maximum concentrations allowable for the TCLP listed in § 66261.24(a)(1)(B) are potential federal ARARs for determining whether the site has hazardous waste. If the site waste has concentrations exceeding these values, it is determined to be a characteristic RCRA hazardous waste.

RCRA LDRs at CCR Title 22, § 66268.1(f), are potential federal ARARs for discharging waste to land. This section prohibits the disposal of hazardous waste to land unless (1) it is treated in accordance with the treatment standards of CCR Title 22, § 66268.40, and the underlying hazardous constituents meet the Universal Treatment Standards at CCR Title 22, § 66268.48; (2) it is treated to meet the alternative soil treatment standards of CCR Title 22, § 66268.49; or (3) a treatability variance is obtained under CCR Title 22, § 66268.44. These are potentially applicable federal ARARs because they are part of the state-approved RCRA program. RCRA treatment standards for non-RCRA, state-regulated waste are not potentially applicable federal ARARs but they may be relevant and appropriate state ARARs. The regulations implementing the RCRA LDRs, including treatment certification requirements at CCR Title 22, § 66268.7, are also ARARs.

Prior to sending any waste off site, the Navy will determine whether the waste is subject to LDRs and will provide the required notices and certifications of § 66268.7.

As long as the excavated material remains inside the area of contamination, it is not considered newly generated waste and will not be subject to RCRA generator, treatment, or other waste management requirements. Should excavated material be moved outside the area of contamination, the substantive RCRA requirements for managing and disposing of hazardous waste (including LDRs) would be applicable.

2.1.2 State Requirements

RCRA Requirements

State RCRA requirements included within the U.S. EPA-authorized RCRA program for California are considered to be potential federal ARARs and are discussed above. When state regulations are either broader in scope or more stringent than their federal counterparts, they are considered potential state ARARs. State requirements such as the non-RCRA, state-regulated hazardous waste requirements may be potential state ARARs because they are not within the scope of the federal ARARs (57 Fed. Reg. 60848). The Cal. Code Regs. tit. 22, div. 4.5 requirements that are part of the state-approved RCRA program would be potential state ARARs for non-RCRA, state-regulated hazardous wastes.

The site waste characteristics need to be compared to the definition of non-RCRA, state-regulated hazardous waste. The non-RCRA, state-regulated waste definition requirements at CCR, Title 22, § 66261.24(a)(2) are potential state ARARs for determining whether other RCRA requirements are potential state ARARs. This section lists the total threshold limit concentrations (TTLCs) and soluble threshold limit concentration (STLCs). The site waste may be compared to these thresholds to determine whether it meets the characteristics for a non-RCRA, state-regulated hazardous waste.

CCR Title 27

Former CCR Title 27, div. 3, ch. 15 requirements that have been repealed and went into effect on 18 July 1997, the following sections define waste characteristics for discharge of waste to land. These requirements may be applicable for soil left in place that was discharged after the effective date of the requirements. They are not potentially applicable to discharges before that date but may be relevant and appropriate.

CCR Title 27, § 20230(a) defines inert waste as waste "that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste." CCR Title 27, § 20230(b) states that "inert wastes do not need to be discharged at classified waste management units." CCR Title 27, § 20230(a) and (b) may be potential state ARARs for soil that meets the definition of inert waste.

CCR Title 27, §§ 20210 and 20220 are state definitions for designated waste and nonhazardous waste, respectively. These may be ARARs for soil that meets the definitions. These soil classifications determine state classification and citing requirements for discharging waste to land.

2.2 GROUNDWATER ARARS

There are no chemical-specific ARARs for groundwater because groundwater is not a medium of concern for this removal action.

3.0 LOCATION-SPECIFIC ARARs

This section discusses potential location-specific ARARs based on various attributes of the TBB Disposal Site's location (such as whether it is in a flood plain). The location-specific ARARs applicable to the TBB Disposal Site are coastal resources, wetlands protection and flood plains management, and biological resources, and are discussed below.

3.1 COASTAL RESOURCES ARARS

This section discusses federal and state location-specific ARARs for coastal resources.

The Coastal Zone Management Act (CZMA) (16 U.S.C. §§ 1451-1464) specifically excludes federal lands from the coastal zone (16 U.S.C. § 1453[l]). Therefore, the CZMA is not potentially applicable to the TBB Disposal Site. The CZMA will be evaluated as a potentially relevant and appropriate requirement. CZMA § 1456(a)(1)(A) requires each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource to conduct its activities in a manner that is consistent to the maximum extent practicable with enforceable policies or approved state management policies. A state coastal zone management program is developed under state law guided by the CZMA and its accompanying implementing regulations in 15 CFR § 930. A state program sets forth objectives, policies, and standards to guide public and private uses of lands and water in the coastal zone. The Navy has determined that the CZMA is relevant and appropriate for the TBB Disposal Site.

The Bay Conservation and Development Commission (BCDC) administers the CZMA within San Francisco Bay. California's approved coastal management program includes the Bay Plan developed by BCDC. The BCDC was formed under the authority of the McAteer-Petris Act, California Government Code §§ 66600-66682, which authorizes the BCDC to regulate activities within San Francisco Bay and the shoreline (100 feet landward from the shoreline) in conformity with the policies of the Bay Plan. The McAteer-Petris Act and the Bay Plan were developed primarily to halt uncontrolled development and filling of the bay. Their broad goals include reducing bay fill and disposal of dredged material in the bay, maintaining marshes and mudflats to the fullest extent possible to conserve wildlife and abate pollution, and protecting the beneficial uses of the bay. Because the Navy has determined that the CZMA, which requires compliance with a state approved coastal management program, is a potential ARAR, the Bay Play, which is a state approved coastal management program is also a potential ARAR.

Non-federal entities must obtain a BCDC permit before they can place fill material in the bay. The permit requirements are not ARARs for the Navy, but the Navy will comply with the substantive provisions of the McAteer-Petris Act and the Bay Plan. For example, the McAteer-Petris Act states that filling of the bay should be authorized only when (1) public benefits from fill clearly exceed public detriment from the loss of the water areas, and (2) no alternative upland location is available. When fill is authorized, the water area to be filled should be the minimum necessary to achieve the purpose of the project, the fill should minimize harmful effects to the bay area, and the fill project must be constructed in accordance with sound safety standards.

All of the TBB Disposal Site alternatives can be implemented in a manner consistent with the goals and substantive requirements of the McAteer-Petris Act and the Bay Plan.

3.2 WETLANDS PROTECTION AND FLOOD PLAINS MANAGEMENT ARARS

This section discusses the federal and state location-specific ARARs for wetlands protection and flood plain management. For habitat restoration, and if any wetlands are destroyed or impaired, the Navy will mitigate and restore wetlands in accordance with the substantive requirements of Executive Order 11990, which is codified at 40 CFR § 6.302(a), and CWA § 404.

Floodplain Management, Executive. Order No. 11988

Under 40 CFR § 6.302(b), federal agencies are required to evaluate the potential effects of action they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.

The substantive provisions of this section and 40 CFR pt. 6, app. A (excluding § 6(a)(2), 6(a)(4), and 6(a)(6)) are potential ARARs because the site is located within a floodplain.

Protection of Wetlands, Executive Order No. 11990

Executive Order No. 11990 requires that federal agencies minimize the destruction, loss, or degradation of wetlands; preserve and enhance the natural and beneficial value of wetlands; and avoid support of new construction in wetlands if a practicable alternative exists.

Executive orders themselves are not ARARs, but they constitute TBC guidance that should be followed in any response action. Executive Order No. 11990 is codified at 40 CFR § 6.302(a). The substantive provisions of 40 CFR § 6.302(a) are potential ARARs because the response action will impact wetlands.

Clean Water Act (33 U.S.C. § 1344)

CWA § 404 governs the discharge of dredged and fill material into waters of the United States, including adjacent wetlands. Wetlands are areas that are inundated by water frequently enough to support vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds

and similar areas. Both the EPA and the U.S. Army Corps of Engineers (USACE) have jurisdiction over wetlands. U.S. EPA's § 404 guidelines are promulgated in 40 CFR § 230, and USACE's guidelines are promulgated in 33 CFR § 320.

The TBB Disposal Site contains wetland areas within its boundaries; therefore, the substantive provisions of Section 404 are potential ARARs.

3.3 BIOLOGICAL RESOURCES ARARS

This section discusses the federal location-specific ARARs for biological resources.

3.3.1 Federal

Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531–1543) provides a means for conserving various species of fish, wildlife, and plants that are threatened with extinction. The ESA defines an endangered species and provides for the designation of critical habitats. Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. Under § 7(a) of the ESA, federal agencies must carry out conservation programs for listed species. The Endangered Species Committee may grant an exemption for agency action if reasonable mitigation and enhancement measures such as propagation, transplantation, and habitat acquisition and improvement are implemented. Consultation regulations at 50 CFR § 402 are administrative in nature and are therefore not ARARs. However, they may be TBCs to comply with the substantive provisions of the ESA.

The salt marsh harvest mouse is a federally listed endangered species that could occur at the TBB Disposal Site. Therefore the substantive provisions of the ESA are potential ARARs.

3.3.2 State

The California Department of Fish and Game provided a list of ARARs for Site 30 in a letter dated August 3, 2004. The Navy has determined that, of those provided by the Department of Fish and Game, the following requirements are ARARs:

- California Fish and Game Code § 5650(a), (b) and (f): This section prohibits depositing or placing where it can pass into waters of the state any petroleum products, factory refuse, sawdust, shavings, slabs or edgings and any substance deleterious to fish, plant life or bird life.

- California Fish and Game Code § 3005: This section prohibits the taking of birds and mammals, including taking by poison.

- California Fish and Game Code § 1908: This section prohibits the taking of rare or endangered native plants.

- California Fish and Game Code § 2080: This section prohibits the take of any endangered or threatened species.

- California Fish and Game Code § 3511: This section provides that it is unlawful to take or possess listed fully protected birds.

- California Fish and Game Code § 4700: This section prohibits the take or possession of listed fully protected mammals or their parts.

- California Fish and Game Code § 3503: This section prohibits the take, possession or needless destruction of the nest or eggs of any bird except as otherwise provided.

- California Fish and Game Code § 3800: This section prohibits the take of nongame birds except in accordance with the regulations of the commission.

- California Fish and Game Code § 8500: This section provides that it unlawful to possess or take, unless otherwise expressly permitted, mollusks, crustaceans, or other invertebrates unless a valid tidal invertebrate permit has been issued.

The following is a TBC for the site:

- California Fish and Game Commission Wetlands Policy: This policy seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California.

The Department of Fish and Game also identified the following requirements, which the Navy has determined are neither applicable nor relevant and appropriate to Site 30:

- California Fish and Game Code § 5050: This section prohibits the take or possession of fully protected reptiles and amphibians.

- California Fish and Game Code § 3503.5: This section prohibits the take, possession, or destruction of any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess or destroy the nests or eggs of such birds.

- California Fish and Game Code § 4000: This section provides that a fur-bearing mammal may only be taken with a trap, a firearm, a bow and arrow, poison under a proper permit, or with the use of dogs.

- California Fish and Game Code § 4150: This section provides that nongame mammals may not be taken or possessed except as otherwise provided.

- California Code of Regulations, Title 14 § 472: This regulation provides that nongame birds and mammals may not be taken except as provided in this section.

- California Code of Regulations, Title 14, section 40: This regulation makes it unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or parts thereof unless a permit has been issued.

- California Code of Regulations, Title 14, section 460: This regulation makes it unlawful to take Fisher, marten, river otter, desert kit fox and red fox.

- California Code of Regulations, Title 14, section 465: This regulation states that fur-bearing mammals may only be taken with a firearm, bow and arrow, or with the use of dogs or traps in accordance with Section 465.5 and Section 3003.1 of the Fish and Game Code.

4.0 ACTION-SPECIFIC ARARS

Potential action-specific ARARs are identified below for the response action alternatives for the TBB Disposal Site.

4.1 ALTERNATIVE 1: NO ACTION

There is no need to identify action-specific ARARs for the no-action alternative because ARARs apply only to "any removal or remedial action conducted entirely on-site" and "no action" is not a removal or remedial action (CERCLA Section 121(e), 42 U.S.C. § 9621[e]). Cleanup standards for selection of a CERCLA remedy, including the requirement to meet ARARs, are not triggered by the no-action alternative (EPA 1991). Therefore, a discussion of compliance with ARARs is not appropriate for this alternative.

4.2 ALTERNATIVE 2: MONITORING

Under Alternative 2, no removal action will be taken. Contaminated soil, sediments, and debris will be left at Site 30 "as is." Annual monitoring will be instituted to evaluate the health of plant and animal populations. A field survey of the plant population will be conducted annually by a qualified biologist. Groundwater samples will be collected yearly to analyze for metals and polynuclear aromatic hydrocarbons (PAHs) to evaluate potential migration of chemicals of potential concern (COPCs) and chemicals of ecological concern (COECs) off site. Monitoring will evaluate only migration of contaminants off site and indicate whether contaminants at Site 30 are bioaccumulating within the ecological receptors. Therefore, there are no ARARs, as this alternative is not designed to eliminate, reduce, or control the potential human health and ecological risk presented by contaminated soil and sediments at Site 30.

4.3 ALTERNATIVE 3: EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LAND USE CONTROLS, AND HABITAT RESTORATION

4.3.1 Excavation

The potential federal ARARs for excavation and off-site disposal are RCRA (42 U.S.C. § 6901 – 6991[I]), the Federal Hazardous Materials Transportation Law (49 U.S.C. § 5101-5127), the Clean Air Act (42 U.S.C. § 7401 et seq.), the Clean Water Act (33 U.S.C. § 1340 et seq. Each set of ARARs is discussed below.

Resource Conservation and Recovery Act

The key threshold question for soil ARARs is whether or not the wastes excavated from the TBB Disposal Site would be classified as hazardous waste. The soil may be classified as a federal hazardous waste as defined by RCRA and the state-authorized program, or as non-RCRA, state regulated hazardous waste. If the soil is determined to be hazardous waste, appropriate requirements will apply.

The federal RCRA requirements at 40 CFR 261 do not apply in California because the state RCRA program is authorized. The authorized state RCRA requirements are, therefore, considered potential federal ARARs. The applicability of RCRA requirements depends on whether the waste is a RCRA hazardous waste; whether the waste was initially treated, stored, or disposed of after the effective date of the particular RCRA requirement; and whether the activity at the site constitutes treatment, storage, or disposal as defined by RCRA. RCRA requirements may, however, be relevant and appropriate even if they are not applicable. Examples include activities that are similar to the definition of RCRA treatment, storage, or disposal for waste that is similar to RCRA hazardous waste.

Determination of whether a waste is a RCRA hazardous waste can be made by comparing the waste to the definition of RCRA hazardous waste. The RCRA requirements at CCR Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100, are potential ARARs because they define RCRA hazardous waste as explained in the chemical-specific ARAR discussion. CCR Title 22, §§ 66262.10(a) and 66262.11 require that a person who generates waste must determine if that waste is hazardous. These regulatory sections have been identified as potential action-specific ARARs.

As long as the excavated material remains inside the area of contamination, however, it is not considered newly generated waste and will not be subject to RCRA generator, treatment, or other waste management requirements. If excavated material is moved outside the area of contamination, the substantive RCRA requirements managing hazardous waste would be applicable (including the LDR requirements of CCR Title 22 § 66268.1(f)) as referenced under the discussion of chemical-specific ARARs in Section 2.0 above). The waste pile regulations at 40 CFR 264 (d)(1)(i–ii) and (d)(2), (e), (f), (h), (i), (j), and (k) are potential ARARs for the temporary storage of hazardous waste. These sections allow generators to accumulate solid remediation waste in a U.S. EPA-designated pile for storage only, up to 2 years, during remedial operations without triggering LDRs.

For any hazardous waste that may be sent off site for disposal, the RCRA pretransport regulations at Cal. Code Regs.,CCR tit.Title 22, §§ 66262.30 (packaging), 66262.31 (labeling), 66262.32 (marking), and 66262.33 (placarding), and RCRA manifest requirements at Cal. Code Regs.,CCR tit.Title 22, §§ 66262.20, 66262.21, 66252.22, and 66262.23 are applicable.

Federal Hazardous Materials Transportation Law

The Federal Hazardous Materials Transportation Law, 49 U.S.C. §§ 5101-5127, 49 CFR §§ 171.2(f), 171.2(g), 172.300, 172.301, 172.302, 172.303, 172.304, 172.312, 172.400, and 172.504, are relevant and appropriate requirements for transporting hazardous waste. These regulatory sections consist of requirements for transporting hazardous wastes, including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements. The substantive provisions of these requirements are potential ARARs.

Clean Air Act

The following Bay Area Air Quality Management District (BAAQMD) regulations are potential ARARs for excavation:

- Regulation 6-302: Opacity Limitation (prohibiting emissions for a period aggregating more than 3 minutes in any hour to greater than or equal to 20 percent opacity)
- Regulation 6-305: Visible Particles (prohibiting the emissions of particles in sufficient number to cause annoyance)

Clean Water Act

The Navy has determined that 40 CFR 122, Subpart C is a potential ARAR for this alternative because this alternative contemplates construction activities that will affect one or more acres. SWRCB Order 99-08 is the state of California General Permit for Discharge of Stormwater Associated with Construction Activities, issued pursuant to 40 CFR 122 Subpart C. The substantive permit requirements are the use of best management practices to prevent construction pollutants from contacting storm water and to keep erosions products from moving off site. Best management practices would be used during excavation to prevent construction pollutants from contacting storm water and to minimize erosional products from moving off site in accordance with SWRCB Order 99-08.

4.3.2 Confirmation Sampling

There are no ARARs for the confirmations sampling planned as part of this alternative.

4.3.3 On-Site Disposal

The following are potential ARARs for solidification and stabilization:

- California Code of Regulations, Title 27 §20080(b) (engineered alternative cover for covering the solidified and stabilized material)

- California Code of Regulations, Title 27 §20420 (post-closure groundwater detection monitoring requirements)

Although the requirements in Title 27 are included, EPA does not always consider it necessary to cover soil that has undergone the solidification and stabilization process. EPA records of decision have selected remedies that use soil that has been treated with this process as backfill without the need for any cover. (See for example Macalloy Corporation August 21, 2002, Record of Decision EPA/ROD/RO4-02/084, EPA ID: SCD003360476.)

The soil disposal cell is considered to be within the area of contamination (AOC) of the site. In general, an AOC is described as an area of continuous contamination of varying amounts and types at a CERCLA site equated to a single RCRA land disposal unit where movement within the unit does not constitute placement. Movement of hazardous waste within the AOC is not a new act of treatment, storage, or disposal under the AOC policy and therefore does not trigger the applicability of RCRA land disposal restrictions or other RCRA requirements. In addition, following the solidification and stabilization process, the soil is expected to be non-hazardous.

4.3.4 Land Use Controls

There are no federal ARARs for land use controls.

The Navy has accepted state statutes as ARARs for implementing institutional controls and entering into an Environmental Restriction Covenant and Agreement with the Department of Toxic Substances Control (DTSC) that include the substantive provisions of the California Civil Code § 1471 and California Health and Safety Code §§ 25202.5, 25222.1, 25234, and 25355.5. DTSC promulgated a regulation on 19 April 2003 regarding "Requirements for Land Use Covenants" at CCR Title 22, § 67391.1. The substantive provisions of these regulations have been determined to be "relevant and appropriate" state ARARs by the Navy.

The substantive provisions of California Civil Code § 1471 are the following general narrative standard: "to do or refrain from doing some act on his or her own land . . . where . . . : (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in Section 25260 of the Health and Safety Code." This narrative standard would be implemented through incorporation of a restrictive environmental covenant and argreement which would be recorded and run with the land.

The substantive provisions of California Health and Safety Code § 25202.5 are the general narrative standard to restrict "present and future uses of all or part of the land on which the . . . facility . . . is located . . . ." These substantive provisions will be implemented by incorporation of restrictive environmental covenants in the Environmental Restriction Covenant and Agreement for purposes of protecting present and future public health and safety.

California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) provide the authority for the state to enter into voluntary agreements to establish land-use covenants with the owner of property. The substantive requirements of the following California Health and Safety Code § 25222.1 provisions are relevant and appropriate: (1) the general narrative standard: "restricting specified uses of the property,..." and (2) "…the agreement is irrevocable, and shall be recorded by the owner, …as a hazardous waste easement, covenant, restriction or servitude, or any combination thereof, as appropriate, on the present and future uses of the land." The substantive requirements of the following California Health and Safety Code § 25355.5(a)(1)(C) provisions are relevant and appropriate: "execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land."

The Navy will comply with the substantive requirements of California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) by incorporating the CERCLA land use controls into the Navy's Environmental Restriction Covenant and agreement.

California Health and Safety Code § 25234 sets forth relevant and appropriate substantive criteria for the removal of a land-use restriction on the grounds that "the waste no longer creates a significant existing or potential hazard to present or future public health or safety."

U.S. EPA does not agree with the Navy and DTSC that the sections of the California Civil Code and California Health and Safety Code cited above are ARARs because they fail to meet the criteria for ARARs pursuant to U.S. EPA guidance (i.e., they are administrative, not substantive, requirements that establish a discretionary way to implement land-use restrictions). However, U.S. EPA agrees that the substantive provisions of the recently promulgated regulation (CCR Title 22, § 67391.1) providing for execution of a land-use covenant between the Navy and DTSC is a relevant and appropriate state ARAR. CCR Title 22 Section 67391.1 provides that DTSC will not approve or concur in a response action decision document that includes LUCs unless the controls are clearly set forth and defined in the decision document. This section also states, among other requirements, that DTSC will not consider property owned by the federal government to be suitable for transfer to nonfederal entities where hazardous materials, hazardous wastes or constituents, or hazardous substances remain at the property at levels that are not suitable for unrestricted use without an LUC. The substantive provisions of Section 67391(e)(2) are potential ARARs.

4.3.5 Habitat Restoration

There are no action-specific ARARs for habitat restoration. Habitat will be restored in accordance with the location-specific ARARs identified above.

4.4 ALTERNATIVE 4: EXCAVATION, OFF-SITE DISPOSAL AND HABITAT RESTORATION

4.4.1 Excavation and Off-Site Disposal

With the exception of the on-site disposal ARARs identified under Section 4.3.3, the same ARARs identified for excavation for Alternative 3 apply to the excavation and off-site disposal for Alternative 4.

4.4.2 Habitat Restoration

There are no action-specific ARARs for habitat restoration. Habitat will be restored in accordance with the location-specific ARARs identified above.

REFERENCES

U.S. Environmental Protection Agency (EPA). 1986. "Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy."

EPA. 1988. "CERCLA Compliance with Other Laws Manual, Draft Guidance." Office of Emergency and Remedial Response. EPA/540/G-89/006. Washington, DC. August.

EPA. 1991. "Management of Investigation-Derived Wastes during Site Inspections." EPA/540/G-91/009. May.

TABLE A-1: FEDERAL POTENTIAL CHEMICAL-SPECIFIC [a] APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
SOIL				
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901–6991[i]) [c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	CCR Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether excavated waste is hazardous.
Land Disposal Restrictions prohibit disposal of hazardous waste unless treatment standards are met.	Hazardous waste land disposal	CCR Title 22 § 66268.1(f)	Applicable	This requirement is applicable if hazardous waste is to be disposed off-site.

Notes:

a Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

b Only the substantive provisions of the requirements cited in this table are potential ARARs.

c Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered potential ARARs.

§ Section
§§ Sections
ARAR Applicable or relevant and appropriate requirement
CCR *California Code of Regulations*
PRG Preliminary Remediation Goals
RCRA Resource Conservation and Recovery Act
TBC To be considered
TCLP Toxicity characteristic leaching procedure
U.S.C. United States Code

TABLE A-2: STATE POTENTIAL CHEMICAL-SPECIFIC [a] APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
		SOIL		
Cal/EPA Department of Toxic Substances Control[c]				
Definition of "non-RCRA hazardous waste."	Waste.	CCR Title 22, § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F)	Applicable	Applicable for determining whether a waste is a non-RCRA hazardous waste.
State Water Resources Control Board[c]				
Definitions of designated waste, nonhazardous waste, and inert waste.	Waste	CCR Title. 27, §§ 20210, 20220, and 20230	Applicable	Potential ARARs for classifying waste.

Notes:

a Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

b Only the substantive provisions of the requirements cited in this table are potential ARARs.

c Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered potential ARARs.

§ Section

§§ Sections

ARAR Applicable or relevant and appropriate requirement

CCR *California Code of Regulations*

TABLE A-3: FEDERAL POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Coastal Zone Management Act (16 U.S.C. §§ 1451–1464)[b]					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs including the San Francisco Bay Plan.	Activities affecting the coastal zone, including lands thereunder and adjacent shore land	16 U.S.C. § 1456(c) 15 CFR § 930	Relevant and appropriate	Remedial alternatives will comply with the CZMA and San Francisco Bay Plan
Endangered Species Act of 1973 (16 U.S.C. §§ 1531–1543)[b]					
Habitat upon which endangered species or threatened species depend	Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. The Endangered Species Committee may grant an exemption for agency action if reasonable mitigation and enhancement measures such as propagation, transplantation, and habitat acquisition and improvement are implemented.	Determination of effect upon endangered or threatened species or its habitat. Critical habitat upon which endangered species or threatened species depend.	16 U.S.C. § 1536(a), (h)(1)(B)	Applicable	Applicable if endangered species are found at TBB Disposal Site
Executive Order No. 11990, Protection of Wetlands[b]					
Wetland	Action to minimize the destruction, loss, or degradation of wetlands	Wetland as defined by Executive Order No. 11990, Section 7	40 CFR § 6.302(a)	Applicable	Applicable to activities that result in the destruction, loss, or degradation of wetlands.
Clean Water Act of 1977, as Amended, § 404 (33 U.S.C. § 1344)[b]					
Wetland	Action to prohibit discharge of dredged or fill material into wetland without permit	Wetland as defined by Executive Order No. 11990, Section 7	33 U.S.C. § 1344	Applicable	Any response action that calls for the discharge of dredged or fill material into a wetland will comply with this potential ARAR.
Executive Order No. 11988, Floodplain Management[b]					
Within floodplain	Actions taken should avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values.	Action that will occur in a floodplain (i.e., lowlands) and relatively flat areas adjoining inland and coastal waters and other flood-prone areas.	40 CFR § 6.302(b) 40 CFR pt. 6, app. A, excluding § 6(a)(2), 6(a)(4), and 6(a)(6)	Applicable	Substantive provisions may be potentially relevant and appropriate for response actions within a 100-year floodplain.

TABLE A-3: FEDERAL POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Notes:

a Only the substantive provisions of the requirements cited in this table are potential ARARs.

b Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs follow each general heading; only substantive requirements of the specific citations are considered potential ARARs.

§	Section	CFR	*Code* of Federal Regulations
§§	Sections	CZMA	Coastal Zone Management Act
ARAR	Applicable or relevant and appropriate requirement	U.S.C.	United States Code

TABLE A-4: STATE POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Aquatic habitat	Action must be taken if toxic materials are placed where they can enter the waters of the state	Materials entering the waters of the state	California Fish and Game Code § 5650(a)(b) and(f)	Relevant and Appropriate	This section is potentially relevant and appropriate.
Wildlife species	Action must be taken to prohibit the taking of birds and mammals.	Taking of birds and mammals	California Fish and Game Code § 3005	Relevant and Appropriate	This section is potentially relevant and appropriate.
Rare native plants	Prohibits the taking of rare or endangered native plants.	Taking of rare native plants	California Fish and Game Code §1908	Relevant and Appropriate	This section is potentially relevant and appropriate.
Endangered species habitat	No person shall import, export, take, possess, or sell any endangered or threatened species or part or product thereof.	Threatened or endangered species determination on or before 01 January 1985 or a candidate species with proper notification.	California Fish and Game Code § 2080	Relevant and Appropriate	This section is potentially relevant and appropriate.
Fully protected bird species/ habitat	Provides that it is unlawful to take or possess listed fully protected birds.	Taking of protected birds	California Fish and Game Code § 3511	Relevant and Appropriate	This section is potentially relevant and appropriate.
Wetlands	This policy seeks to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California.	Impact to wetlands	Fish and Game Commission Wetlands Policy (1988)	TBC	This section is a potential TBC criterion.
Fully protected mammals	This section prohibits the take or possession of listed fully protected mammals or their parts.	Taking of fully protected mammals	California Fish and Game Code § 4700	Relevant and Appropriate	This section is potentially relevant and appropriate.
Fully protected reptiles and amphibians	This section prohibits the take or possession of fully protected reptiles and amphibians.	Taking of fully protected reptiles and amphibians	California Fish and Game Code § 5050	Not an ARAR	No fully protected reptiles or amphibians will be taken at the site.
Birds	This section prohibits the take, possession or needless destruction of the nest or eggs of any bird except as otherwise provided.	Taking of birds	California Fish and Game Code § 3503	Relevant and Appropriate	This section is potentially relevant and appropriate.

TABLE A-4: STATE POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Birds of prey	This section prohibits the take, possession, or destruction of any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess or destroy the nests or eggs of such birds.	Taking of birds of prey	California Fish and Game Code § 3503.5	Not an ARAR	No birds of prey will be taken at the site.
Nongame birds	This section prohibits the take of nongame birds except in accordance with the regulations of the commission.	Taking of nongame birds	California Fish and Game Code § 3800	Relevant and Appropriate	This section is potentially relevant and appropriate.
Fur-bearing mammals	This section provides that a fur-bearing mammal may only be taken with a trap, a firearm, a bow and arrow, poison under a proper permit, or with the use of dogs.	Taking of fur-bearing mammals	California Fish and Game Code § 4000	Not an ARAR	This section defines fur-bearing mammals as pine marten, fisher, wolverine, mink, river otter, gray fox, cross fox, silver fox, red fox, kit fox, raccoon, beaver, badger, and muskrat. No fur-bearing mammals will be affected at the site.
Nongame mammals	This section provides that nongame mammals may not be taken or possessed except as otherwise provided.	Taking of nongame mammals	California Fish and Game Code § 4150	Not an ARAR	No nongame mammals will be taken at the site.
Nongame animals	This regulation provides that nongame birds and mammals may not be taken except as provided in this section.	Taking of nongame animals	CCR Title 14, § 472	Not an ARAR	No nongame birds or mammals will be taken at the site.
Tidal invertebrates	This section provides that it unlawful to possess or take, unless otherwise expressly permitted, mollusks, crustaceans, or other invertebrates unless a valid tidal invertebrate permit has been issued	Taking of invertebrates	California Fish and Game Code § 8500	Relevant and Appropriate	This section is potentially relevant and appropriate.

TABLE A-4: STATE POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Protected Amphibians	This regulation makes it unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or parts thereof unless a permit has been issued.	Taking of protected amphibians	CCR Title 14, § 40	Not an ARAR	No protected amphibians will be captured, collected, intentionally killed or injured, possessed, purchased, propagated, sold, transported, imported, or exported.
Fur-bearing mammals	This regulation makes it unlawful to take Fisher, marten, river otter, desert kit fox and red fox.	Taking of fur-bearing mammals	CCR Title 14, § 460	Not an ARAR	No fur-bearing mammals will be taken at the site.
Fur-bearing mammals	This regulations states that fur-bearing mammals may only be taken with a firearm, a bow and arrow, or with the use of dogs or traps in accordance with Section 465.5 and Section 3003.1 of the Fish and Game Code.	Taking of fur-bearing mammals	CCR Title 14, § 465	Not an ARAR	No fur-bearing mammals will be taken at the site.

Notes:

a Only the substantive provisions of the requirements cited in this table are potential ARARs.

b Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs follow each general heading; only substantive requirements of the specific citations are considered potential ARARs.

§ Section

§§ Sections

ARAR Applicable or relevant and appropriate requirement

CCR *California Code of Regulations*

TABLE A-5: FEDERAL POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
		EXCAVATION			
RCRA (42 U.S.C., Chapter 82, §§ 6901-6991[i]) *					
On-site waste generation	Person who generates waste shall determine if that waste is a hazardous waste.	Generator of waste	CCR Title 22 §§ 66262.10(a), 66262.11	Applicable	Applicable where hazardous waste is generated
Off-site disposal	LDRs prohibit disposal of hazardous waste unless treatment standards are met. Generators must certify whether waste meets or does not meets the LDR treatment standards.	Hazardous waste land disposal	CCR Title 22, § 66268.7	Applicable	Applicable if hazardous waste is to be disposed of on land
Waste pile	Allows generators to accumulate solid remediation waste in a U.S. EPA-designated pile for storage only, up to 2 years, during remedial operations without triggering LDRs.	Hazardous remediation waste temporarily stored in piles.	40 C.F.R. § 264.554(d)(1)(i–ii) and (d)(2), (e), (f), (h), (i), (j), and (k)	Relevant and appropriate	May be ARARs for temporary waste storage.
Pre-transport requirements	Hazardous waste must be packaged in accordance with DOT regulations prior to transport	Any operation where hazardous waste is generated	CCR Title 22 § 66262.30	Applicable	Applicable if hazardous waste is to be transported
	Hazardous waste must be labeled in accordance with DOT regulations prior to transport	Any operation where hazardous waste is generated	CCR Title 22 § 66262.31	Applicable	Applicable if hazardous waste is to be transported
	Provides requirements for marking hazardous waste prior to transport	Any operation where hazardous waste is generated	CCR Title 22 § 66262.32	Applicable	Applicable if hazardous waste is to be transported
	A generator must ensure that the transport vehicle is correctly placarded prior to transport of hazardous waste.	Any operation where hazardous waste is generated	CCR Title 22 § 66262.33	Applicable	Applicable if hazardous waste is to be transported
	Requires preparation of a manifest for transport of hazardous waste off site	Any operation where hazardous waste is generated	CCR Title 22 §§ 66262.20-66262.23	Applicable	Applicable if hazardous waste is to be transported

TABLE A-5: FEDERAL POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Federal Hazardous Materials Transportation Law (49 U.S.C. §§ 5101-5127) *					
Transportation of hazardous material	Sets forth requirements for transporting hazardous waste, including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements	Interstate carriers transporting hazardous wastes and substances by motor vehicle	49 U.S.C. §§ 5101-5127 49 CFR §§ 171.2(f), 171.2(g), 172.300, 172.301,172.302, 172.303, 172.304, 172.312, 172.400, and 172.504	Relevant and appropriate	Relevant and appropriate for transporting hazardous materials on site.
Clean Air Act (42 U.S.C. § 7401 et seq.) *					
Excavation	Sets forth opacity limitations	Excavation	BAAQMD, Regulation 6-302	Applicable	Applicable for excavation.
Excavation	Prohibits the emission of particles in sufficient number to cause annoyance	Release of particles	BAAQMD Regulation 6-305	Applicable	This requirement is applicable for excavation.
Clean Water Act of 1988, as Amended, Section 404 (33 U.S.C., § 1344) *					
Storm water discharge	Order 99-08-DQW is the State of California general permit for storm water discharge from construction. It requires use of best management practices to reduce pollutants.	Storm water discharge	40 CFR Part 122, Subpart C SWRCB Order 99-08 adopted pursuant to 40 CFR Part 122, Subpart C	Relevant and appropriate	Order 99-08-DQW applies to excavation that affects at least 1 acre. Pursuant to the substantive permit requirements, best management practices will be taken to prevent construction pollutants from contacting storm water and keep erosion products from moving off site.

TABLE A-5: FEDERAL POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Notes:

*	Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs.
§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
CCR	*California Code of Regulations*
CFR	*Code of Federal Regulations*
Chapter	Chapter
DOT	U.S. Department of Transportation
DQW	Department of Water Quality
LDR	Land Disposal Restriction
PCB	Polychlorinated biphenyl
ppm	Part per million
RCRA	Resource Conservation and Recovery Act
SWRCB	State Water Resources Control Board
U.S.C.	United States Code

TABLE A-6: STATE POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
ON-SITE DISPOSAL					
California Code of Regulations, Title 27*					
Groundwater monitoring	Provides minimum requirements for a groundwater detection monitoring program.	Discharge of waste to land after 18 July 1997	CCR Title 27 §20420	Relevant and appropriate	The groundwater monitoring requirements are potentially relevant and appropriate for the alternative involving on-site disposal.
Cover of disposal cell	Alternatives to construction or prescriptive standards.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 unless otherwise noted.	CCR Title 27 § 20080 (b)	Relevant and appropriate	This requirement is potentially relevant and appropriate for the alternative involving on-site disposal after stabilization.
LAND USE CONTROLS					
California Civil Code*					
Land use controls	Provides conditions under which land use restrictions will apply to successive owners of land.	Environmental Restriction	California Civil Code § 1471	Applicable	Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land … where (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety of the environment as a result of the presence of hazardous materials, as defined in Section 25260 of the California Health and Safety Code." This narrative standard would be implemented through incorporation an environmental restriction.

TABLE A-6: STATE POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
California Code Regulations Title 22*					
Land Use Controls	Sets forth recording requirements for land use covenants.	Recorded Land Use Control	Title 22 CCR 67391.1(e)(2)	Applicable	The substantive provisions of § 67391.1(e)(2) are potential ARARs.
California Health and Safety Code*					
Land Use Controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Environmental restriction	California Health and Safety Code § 25202.5	Relevant and appropriate	The substantive provisions of this section are the general narrative standards to restrict "present and future uses of all or part of the land on which the facility …is located."
Land use controls	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of California Health and Safety Code § 25232(b)(1)(A)–(E).	Environmental restriction	California Health and Safety Code § 25222.1	Relevant and appropriate	California Health and Safety Code § 25222.1 provides the authority for the state to enter into voluntary agreements to establish land-use covenants with the owner of the property. The substantive provision of California Health and Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."
Land use controls	Provides authority for the state to enter into voluntary agreements to establish land use controls with property owners.	Environmental restriction	California Health and Safety Code § 25355.5(a)(1)(C)	Relevant and appropriate	This section is potentially relevant and appropriate.
Land use controls	Substantive criteria for the removal of a land-use restriction	Transfer property from the Navy to a nonfederal agency	California Health and Safety Code § 25234	Relevant and appropriate	This section contains substantive criteria for the removal of a land-use restriction on the grounds that "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety."

TABLE A-6: STATE POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Final, Engineering Evaluation and Cost Analysis, Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Notes:

*	Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs.
§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
CCR	*California Code of Regulations*
CFR	*Code of Federal Regulations*
Chapter	Chapter
DOT	U.S. Department of Transportation
DQW	Department of Water Quality
LDR	Land Disposal Restriction
PCB	Polychlorinated biphenyl
ppm	Part per million
RCRA	Resource Conservation and Recovery Act
SWRCB	State Water Resources Control Board
U.S.C.	United States Code

APPENDIX B
REMOVAL ACTION ALTERNATIVE COST SUMMARY

CONTENTS

TABLES

1.0 INTRODUCTION

The following text describes each alternative and its associated components and the assumptions used to develop the cost estimate for Site 30, the Taylor Boulevard Bridge (TBB) Disposal Site at Naval Weapons Station Seal Beach Detachment Concord in Concord, California. After the text are the backup spreadsheets and specific assumptions used to estimate the costs associated with each alternative proposed for cleanup at Site 30, the TBB Disposal Site.

2.0 PURPOSE OF ESTIMATES

Cost estimates developed during the detailed analysis phase are used to compare alternatives and support remedy selection. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) includes the following language in its description of the cost criterion for the detailed analysis and remedy selection:

> "The types of costs that shall be assessed include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operations and maintenance costs; and (3) Net present value of capital and O&M [operations and maintenance] costs (40CFR [Code of Federal Regulations] 300.430 (e)(9)(iii)(G))" (EPA 2000)

3.0 TYPES OF COST ESTIMATING METHODS

The cost estimates presented in this appendix were developed using both detailed and parametric approaches; both are accepted by the U.S. Environmental Protection Agency (EPA), as described below:

The detailed approach estimates cost on an item-by-item basis. Detailed methods typically rely on compiled sources of unit cost data for each item, taken from either a built-in database (if part of a software package, for example) or from other sources (for example, cost estimating references). This method, also known as "bottom up" estimating, is used when design information is available.

The parametric approach relies on relationships between cost and design parameters. These relationships are usually statistically or model-based. Statistically based approaches rely on scaled-up or scaled-down versions of projects where historical cost data are available. Model-based approaches use a generic design linked to a cost database and adjusted for site-specific information. This method, also know as "top down" estimating, is used when design information is not available (EPA 2000).

4.0 METHODOLOGY

The Remedial Action Cost Engineering and Requirements System (RACER) 2004 was the primary source of cost data (Earth Tech 2004). Costs for unique line items that are not included in RACER were based on vender quotes. Excel spreadsheets were used to tabulate costs and

calculate net present values (NPV) in 2004 dollars; RACER outputs are presented in 2004 dollars.

4.1 DESCRIPTION OF RACER

RACER is a cost estimating tool that estimates costs for all phases of remediation (Earth Tech 2004). RACER can be used to evaluate costs for interim studies and measures, remedial design and corrective measures, remedial and corrective action, operations and maintenance (O&M), long-term monitoring, and site closeout. The system was originally developed in 1991 under U.S. Department of the Air Force funding. Numerous revisions and updates have been incorporated through several releases since RACER was introduced.

RACER is a parametric cost modeling system that uses a patented methodology for estimating costs. The RACER cost database is a duplicate of the Environmental Cost Handling Options and Solutions (ECHOS) cost database, which was published by the R.S. Means Company. RACER cost estimates are based on generic engineering solutions for environmental projects, technologies, and processes. Historical project information, industry data, government laboratories, construction management agencies, vendors, contractors, and engineering analysis were used to develop generic solutions to engineering problems. Cost estimates in RACER are tailored specifically to each project by adding site-specific parameters to reflect project-specific conditions and requirements. The tailored design is then translated into specific quantities of work, and the quantities of work are priced using current price data.

4.2 USER-DEFINED COSTS

It was not always possible to develop RACER cost estimates because of unique characteristics for some elements of the remediation alternatives. The costs of these elements were therefore estimated using vendor quotes and were evaluated and adjusted as necessary to account for inflation.

5.0 COMPONENTS OF COST ESTIMATE

Cost estimates for the remediation alternatives include capital costs, annual O&M or periodic costs, cost of capital, NPV of O&M or periodic costs, contingency allowances, and escalation costs for dated data. Each of these factors is discussed in further detail in the following text.

5.1 CAPITAL COSTS

Capital costs include direct and indirect costs. Costs incurred for equipment, material, labor, construction, development, and implementation of remedial technologies are included as direct costs. Indirect costs include health and safety, site supervision, engineering, overhead and profit, and startup. Indirect costs are included in the estimate as either a separate line item or as a percentage of the direct capital cost.

5.2 ANNUAL OPERATION AND MAINTENANCE AND PERIODIC COSTS

Annual O&M costs include costs incurred after construction. These costs are necessary to assure that a remedial action is effective. Annual O&M costs typically include power, operating labor, consumable materials, purchased services (for example, laboratory analysis), equipment replacement, maintenance, sampling, permit fees, annual reports, and site reviews.

Periodic costs occur once every few years or once during the entire O&M period. Examples include 5-year reviews, equipment replacement, site closeout, and remedy failure and replacement.

5.3 PRESENT VALUE ANALYSIS

Remedial action projects typically involve construction costs that are expended at the beginning of a project (capital costs) and costs in subsequent years (operation and maintenance or periodic costs). Present value (PV) analysis is a method to evaluate expenditures that occur over various periods. This standard methodology allows for cost comparisons of different remedial alternatives on the basis of a single figure for each alternative. This single value, referred to as the present value, is the amount needed to be set aside at the initial point in time (the base year) to assure that funds will be available in the future as they are needed. PV analysis uses a discount rate and period of analysis to calculate the PV of each expenditure.

5.3.1 Discount Rate

A discount rate is similar to an interest rate and is used to account for the time value of money. A dollar is worth more today than in the future because, if invested in an alternative use today, the dollar would earn interest. If the capital were not employed in a specific use, it would have a productivity value in alternative uses. The choice of a discount rate is important because the rate selected directly affects the present value of a cost estimate, which is then used in making a decision on remedy selection.

EPA policy on the use of discount rates for cost analysis is stated in the preamble to the NCP (55FR8722) and in Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-20 (EPA 1993). Discount rates used in economic analysis by the federal government are specified in Office of Management and Budget (OMB) Circular A-94. The current discount rate for a 30-year stream of payments is 3.5 percent (OMB 1993).

5.3.2 Present Value

The PV of a series of equal annual future payments such as annual O&M payments is calculated using the following equation:

$$PV = \sum_{t=1}^{n} \frac{x_t}{(1+i)^t}$$

where

PV = Present value

x_t = Payment in year t (t = 0 for present or base year)

i = Discount factor

t = Number of years following construction that expenditure start

n = Number of years that the stream of equal annual future payments will run

The present value of a single periodic future payment is calculated using the following equation:

$$PV = \frac{x_t}{(1+i)^t}$$

where

PV = Present value

x_t = Payment in year t (t = 0 for present or base year)

i = Discount factor

t = Number of years following construction that expenditure occur

The PV of a remedial alternative represents the sum of the present values of all future payments associated with the project. PV for this cost estimate is calculated using 2004 dollars.

5.4 CONTINGENCY ALLOWANCES

Contingency is factored into a cost estimate to cover unknown factors, unforeseen circumstances, or unanticipated conditions that are not possible to evaluate from the data on hand at the time the estimate is prepared. The two main types of contingency are scope and bid. Scope contingency covers unknown costs that could result from changes in the scope that may occur during design. Bid contingency covers unknown costs associated with constructing or implementing a given project scope.

5.5 ESCALATION COSTS

Escalation costs reflect the increase in project costs over time as a result of inflation. The costs do not need to be escalated because RACER output costs are expressed in 2004 dollars (Earth Tech 2004).

6.0 INDIVIDUAL COST ESTIMATE ASSUMPTIONS

This section identifies the assumptions and parameters used in developing cost estimates for remediation at Site 30. A summary of the costs for all the alternatives is presented in Table B-1. Tables B-2 through B-4 present the total removal costs for each alternative at Site 30.

6.1 COST AND ASSUMPTIONS ASSOCIATED WITH ALTERNATIVE 2: MONITORING

This section provides the assumptions used in the costs for Alternative 2. The proposed removal alternatives are summarized in Section 4.0 of the main engineering evaluation and cost analysis (EE/CA) text; detailed descriptions and analyses of this alternative are presented in Section 4.8.

Costs associated with this alternative are presented in Table B-2.

This alternative includes monitoring groundwater for 30 years

6.1.1 Assumptions

Assumptions made are provided in the following list:

- **Sampling for PCBs in Soil**
  - Five shallow soil samples will be collected from the perimeter of the excavation area by hand auger and will be analyzed for polychlorinated biphenyls (PCBs).
- **Biological Survey**
  - A biological survey will be conducted annually to evaluate whether habitat for the pickleweed and salt marsh harvest mouse is affected.
- **Monitoring**
  - Three groundwater samples will be collected quarterly in the first year and annually thereafter, using pumps, for 30 years from a depth of 10 feet below ground surface (bgs) and will be analyzed for lead, chromium, copper, iron, mercury, selenium, zinc, benzo(a)pyrene, benzo(b)fluoranthene, and PCBs. Quality control samples will be collected at a frequency of 10 percent of the total number of samples.
  - The wells will be abandoned, and a close-out report will be written at the end of 30 years.

6.2 COST AND ASSUMPTIONS ASSOCIATED WITH ALTERNATIVE 3: EXCAVATION, ON-SITE DISPOSAL, LAND USE CONTROLS (LUCS), AND HABITAT RESTORATION.

This section provides the assumptions used in the costs for Alternative 3. The proposed removal alternatives are summarized in Section 4.0 of the main EE/CA text; detailed descriptions and analyses of this alternative are presented in Section 4.9. Costs associated with this alternative are presented in Table B-3.

6.2.1 Assumptions

The general assumptions used for Alternative 3 are listed as follows:

- **Sampling for PCBs in Soil**
  - Five shallow soil samples will be collected from the perimeter of the excavation area by hand auger and will be analyzed for PCBs.
- **Mobilization**
  - Underground utilities will be located.
  - Heavy equipment will be mobilized.
  - Truck scales will be rented.
  - Baseline data will be collected using data from Site 1.
  - A health and safety program will be in place before any construction begins.
- **Haul Road Construction**
  - The haul road will be 7,000 feet long (extending from the existing road to beneath the TBB), one lane, crown section, dirt, with one temporary railroad crossing (to be completed by the railroad company). Approximately 4,000 linear feet of the road is already suitable for hauling; this section will not be further developed.
  - The roadbed will be 12 feet wide; shoulders will be 3 feet wide on either side of the road.
  - Subgrade will be 18 inches thick.
  - The roadway will be cleared of light brush and trees for construction.
  - Soil type is a silt/silty-clay mixture.
  - No stabilization will be required; no base material will be needed in construction of the haul road.

- **Preliminary Site Construction Work**
  - A 6-foot tall mouse-proof fence (wood) will be constructed along the eastern side of the debris excavation area (approximately 300 linear feet) to protect the salt marsh harvest mouse. Mice will be trapped and removed before construction begins. A biological monitor will be on site to ensure that work does not harm the salt marsh harvest mouse.
  - An 8-foot high Aqua-Barriers with patented anti-roll internal baffle system will be installed. The barrier will be approximately 600 feet long and will be capable of controlling up to 6 feet of standing water and sediment. A vendor quote was obtained from Hydro Solutions, Inc.
  - The three monitoring wells within the footprint of the excavation will be destroyed before excavation begins.
  - An area approximately 16,000 square feet will be excavated to 10 feet bgs and located northeast of and adjacent to the current debris area. Soil excavated from this area will be stockpiled for possible reuse as topsoil over the soil debris or for reconstruction of the wetland habitat if found suitable. Soil will be sampled and analyzed for metals, semivolatile organic compounds (SVOCs), total organic compound (TOC), and particle size distribution to evaluate its suitability.
  - A staging area, located adjacent to and east of the debris area, will be cleared for equipment storage.
  - Load distribution mats will be in place over 10 percent of the wetlands to reduce damage to geology from heavy equipment working on soft soils. Equipment will use vegetable-based oils to prevent further contamination. Heavy equipment will be decontaminated.

- **Excavation**
  - The contaminated soil excavation area is approximately 45,000 square feet and an average of 2 feet deep.
  - No rock will require blasting or ripping.
  - There are no drums that need to be removed.
  - Soil is a sand-silt/sand-clay mixture.
  - Dewatering will be required throughout the excavation process.
  - No ground penetrating radar will be used.
  - Excavation will take place on a grid, with approximately 30 squares of 35 feet by 35 feet included in the grid. Fifty confirmation samples will be collected and analyzed for lead.
  - The excavated volume will be approximately 4,300 cubic yards (assuming the bulking factor is 1.3).
  - All backfill will come from excavation of the soil disposal area (if deemed suitable for backfill) or from off site. This cost estimate assumed that soil from the disposal area will be suitable for backfill.

- The existing cover is soil/gravel; the replacement cover will be soil/gravel.
- A 12 cubic yard (yd^3) dump truck with operator will be on site for 2 months (40 days), 10 hours per day to carry the excavated soil to the soil disposal area.
- A plastic laminate waste pile cover will be used to cap the stockpiled material; the cover will be approximate 1/10 acre and will not include a passive gas vent system.
- Topsoil, soil cover, and leveling layer will all come from an on-site source. Soil cover will be 12 inches thick and leveling layer will be 6 inches thick.

- **Stabilization**
  - Approximately 4,500 yd^3 of soil and debris (including the concrete pad) will be stabilized in the soil disposal area.
  - The soil and debris have average density of 100 pounds per cubic foot.
  - A mobile, 15-cubic-yard stabilization unit will be used.
  - Initial moisture content of the waste will be 15 percent, and it will take 20 minutes to mix each batch.
  - The cement to waste ratio will be 0.150:1, the water to cement ratio will be 0.400:1, and proprietary chemicals will be used at 0.010:1 (chemical to waste). The total waste disposal volume will be approximately 5,700 cubic yards.

- **Backfill**
  - Wetland compactable soil will be used to backfill and restore the wetlands area. If found suitable, soil from excavation of the soil disposal area will be used as backfill. The fill be compacted and tested.

- **Capping**
  - The disposal cell will be capped with a standard cover, including a leveling layer of soil (at least 6 inches thick), a compacted layer of soil (approximately 18 inches thick), and a layer of soil and vegetation (approximately 6 inches thick).
  - The cover will have 3:1 slope, all cover soil will come from on site.

- **Installation of two Groundwater Monitoring Wells**
  - Two groundwater monitoring wells will be installed to 15 feet bgs, screened from 5-10 feet bgs.
  - The wells will be constructed of 2-inch polyvinyl chloride (PVC) and will be located between the disposal cell and the wetlands to confirm that contaminants in the excavated material have stabilized and are not leaching into the wetlands.

- **Wetlands Restoration**
  - The wetland area will be graded to support the pickleweed habitat. A sediment control fence will be installed along the eastern border of the wetland area to help prevent erosion of the pickleweed habitat.
  - New pickleweed will be planted at the site because pickleweed from the debris area may hold contaminated soil to its roots. Pickleweed will be harvested in a greenhouse and should be planted in the spring. Plants will be planted on 2-foot centers covering the 45,000-square-foot area. A vendor quote was obtained from Pacific OpenSpace, Inc.
- **Post-construction Activity**
  - Temporary railroad and ditch crossings will be removed, equipment will be demobilized, and general site cleanup will occur.
- **Biological Survey**
  - A biological survey will be conducted annually for 3 years to ensure the habitat for the pickleweed and salt marsh harvest mouse is protected.
- **Monitoring**
  - Two groundwater monitoring wells will be sampled annually, using pumps, for 30 years from a depth of 10 feet bgs and will be analyzed for lead, chromium, copper, iron, mercury, selenium, zinc, benzo(a)pyrene, benzo(b)fluoranthene, and PCBs. One quality control (QC) sample will also be collected with each event.
- **Land Use Controls**
  - Land use controls will be in place for 30 years to prohibit residential or commercial use of the site unless the site is deemed suitable for these uses. An annual inspection will be included to verify the integrity of the disposal cell cap.

6.3 COST AND ASSUMPTIONS ASSOCIATED WITH ALTERNATIVE 4: EXCAVATION, OFF-SITE DISPOSAL, AND HABITAT RESTORATION

This section provides the assumptions used in preparing the costs for Alternative 4. The proposed removal alternatives are summarized in Section 4.0 of the main EE/CA text, and detailed descriptions and analyses of this alternative are presented in Section 4.10. Costs associated with this alternative are presented in Table B-4.

6.2.1 Assumptions

The general assumptions used for Alternative 4 are listed as follows:

- **Sampling for PCBs in Soil**
  - Five shallow soil samples will be collected from the perimeter of the excavation area by hand auger and will be analyzed for PCBs.
- **Mobilization**
  - Underground utilities will be located.
  - Heavy equipment will be mobilized.
  - Truck scales will be rented.
  - Baseline data will be collected using data from Site 1.
  - A health and safety program will be in place before any construction begins.
- **Haul Road Construction**
  - The haul road will be 7,000 feet long (extending from the existing road to beneath the TBB), one lane, crown section, dirt, with one temporary railroad crossing (to be completed by the railroad company). Approximately 4,000 linear feet of the road is already suitable for hauling; this section will not be further developed.
  - The roadbed will be 12 feet wide; shoulders will be 3 feet wide on either side of the road.
  - Subgrade will be 18 inches thick
  - The roadway will be cleared of light brush and trees for construction.
  - Soil type is silt/silty-clay mixture.
  - No stabilization will be required; no base material will be needed in construction of the haul road.
- **Preliminary Site Construction Work**
  - A 6 feet tall mouse-proof fence (wood) will be constructed along the eastern side of the debris excavation area (approximately 300 linear feet) to protect the salt marsh harvest mouse. Mice will be trapped and removed before construction begins. A biological monitor will be on site to ensure work does not harm the salt marsh harvest mouse.
  - An 8-foot high Aqua-Barriers fence with patented anti-roll internal baffle system will be installed. The barrier will be approximately 600 feet long and will be capable of controlling up to 6 feet of standing water and sediment. A vendor quote was obtained from Hydro Solutions, Inc.
  - The three monitoring wells within the footprint of the excavation will be destroyed before excavation begins.

- A staging area, located adjacent and east of the debris area, will be cleared for equipment storage.
- Load distribution mats will be in place over 10 percent of the wetlands to reduce damage to geology from heavy equipment working on soft soils. Equipment will use vegetable-based oils to prevent further contamination. Heavy equipment will be decontaminated.

- **Excavation**
  - The contaminated soil excavation area is approximately 45,000 square feet and 2 feet deep.
  - No rock will require blasting or ripping.
  - No drums need to be removed.
  - Soil is a sand-silt/sand-clay mixture.
  - Dewatering will be required throughout the excavation process.
  - No ground penetrating radar will be used.
  - Excavation will take place on a grid, with approximately 30 squares of 35 feet by 35 feet included in the grid. Fifty confirmatory samples will be collected and analyzed for lead; one sample will be analyzed for toxicity characteristic leaching procedure (TCLP) to evaluate the acceptability of the waste at a landfill.
  - The excavated volume will be approximately 4,300 yd^3 (assuming the bulking factor is 1.3).
  - None of the soil excavated will be used as backfill; all backfill will come from off site.
  - The existing cover is soil/gravel; the replacement cover will be soil/gravel.
  - A 12 yd^3 dump truck with operator will be on site for 2 months (40 days), 10 hours per day to carry the excavated soil to the soil disposal area.
  - A plastic laminate waster pile cover will be used to cap the stockpiled material; the cover will be approximately 1/10 acre and will not include a passive gas vent system.

- **Drying**
  - A concrete pad will be constructed (approximately 12,000 square feet); the excavated soil will be placed on the pad no thicker than 2 feet deep to dry in the sun.
  - A plastic laminate waster pile cover will be used to cap the material overnight; the cover will be approximate 15,000 square feet and will not include a passive gas vent system.

- **Haul**
  - Excavated soil from the debris area will be collected at a debris stockpile and hauled to an appropriate landfill. About 70 percent of the excavated material will be hauled to a Class I landfill, and 30 percent will be hauled to a Class II landfill.
  - A vendor quote was obtained for hauling and disposal. The cost will be $55 per ton for disposal to a Class II facility, $80 per ton for disposal to a Class I facility provided waste does not require stabilization, and $190 for disposal of waste including stabilization at a Class I facility. The quote includes transportation and disposal and associated taxes. The quote was obtained on October 12, 2004, from Stuart Levang, operations manager at DenBeste Transportation, Inc., 820 DenBeste Court, Windsor, California 95492, (800) 838-1477.
  - The landfills require that soils be 100 percent dry and will impose a $400 per load fee to dry any material that does not meet the requirements.
- **Backfill**
  - Wetland compactable soil will be used to backfill and restore the wetlands area. If found suitable, soil from excavation of the soil disposal area will be used as backfill. The fill be compacted and tested.
- **Wetlands Restoration**
  - The wetland area will be graded to support the pickleweed habitat. A sediment control fence will be installed along the eastern border of the wetland area to help prevent erosion of the pickleweed habitat.
  - New pickleweed will be planted at the site because pickleweed from the debris area may hold contaminated soil to its roots. Pickleweed will be harvested in a greenhouse and should be planted in the spring. Plants will be planted on 2-foot centers covering the 45,000-square-foot area. A vendor quote was obtained from Pacific OpenSpace, Inc.
- **Post-construction Activity**
  - Temporary railroad and ditch crossings will be removed, equipment will be demobilized, and general site cleanup will occur.
- **Biological Survey**
  - A biological survey will be conducted annually for 3 years to ensure the habitat for the pickleweed and salt marsh harvest mouse is protected.

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TABLE B-1: SITE 30 COST SUMMARY FOR REMOVAL ACTION ALTERNATIVES

Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COMPARISON OF TOTAL COST OF REMOVAL ACTION ALTERNATIVES

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Description	**No Action**	**Monitoring**	**Excavation, Stabilization, On-site Disposal, LUCs, and Habitat Restoration**	**Excavation, Off-site Disposal, and Habitat Restoration**
Total Project Duration (Years)	0	30	30	3
Capital Cost	$0	$60,221	$1,704,228	$1,820,399
Annual O & M Cost	$0	$304,311	$358,092	$7,202
Total Periodic Cost	$0	$17,076	$15,916	$45,700
Total Present Value of Alternative	**$0**	**$381,608**	**$2,078,236**	**$1,873,301**

Notes:

LUC	Land use control
O & M	Operation and Maintenance
PCB	Polychlorinated biphenyl

TABLE B-2 ALTERNATIVE 2 (MONITORING), TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, biological monitoring and groundwater motioring in the first year, groundwater monitoring until year 30.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
CAPITAL COSTS:							
Sampling for PCBs							5 soil samples collected
Hand Auger Rental	1.00	DAY	23.74	0.00	0.00	$24	from 2 feet bgs
Soil Moisture Content ASTM D2216	5.00	EA	41.48	0.00	0.00	$207	
Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	5.00	EA	291.91	0.00	0.00	$1,460	
Car or Van Mileage Charge	100.00	MI	0.61	0.00	0.00	$61	
Project Scientist	23.00	HR	0.00	172.99	0.00	$3,979	
Field Technician	7.00	HR	0.00	114.12	0.00	$799	
Word Processing/Clerical	3.00	HR	0.00	89.96	0.00	$270	
Draftsman/CADD	3.00	HR	0.00	117.96	0.00	$354	
SUBTOTAL ($2004)						**$6,799**	
Annual Groundwater Monitoring							Three samples will be collected
Disposable Materials per Sample	14.00	EA	12.47	0.00	0.00	$175	quarterly from 10 ft bgs (plus QC)
Decontamination Materials per Sample	14.00	EA	11.13	0.00	0.00	$156	
Nylon Tubing, 1/4" Outside Diameter	145.00	LF	0.65	0.00	0.00	$94	
Water Quality Parameter Testing Device, DO, Temp., pH, Conductivity, Salinity, Turbidity, Daily Rent	4.00	DAY	102.24	0.00	0.00	$409	
Total Dissolved Solids (EPA 160.1), Water Analysis	14.00	EA	25.69	0.00	0.00	$360	
Total Suspended Solids (EPA 160.2), Water Analysis	14.00	EA	25.69	0.00	0.00	$360	
Pesticides/PCBs (EPA 608), Water Analysis	14.00	EA	255.60	0.00	0.00	$3,578	
TAL Metals (EPA 6010/7000s), Water, Water Analysis	14.00	EA	200.00	0.00	0.00	$2,800	
Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)	14.00	EA	178.92	0.00	0.00	$2,505	
4" Submersible Pump Rental, Day	4.00	DAY	112.62	0.00	0.00	$450	
Well Development Equipment Rental (Daily)	4.00	DAY	211.81	0.00	0.00	$847	
Car or Van Mileage Charge	500.00	MI	0.53	0.00	0.00	$265	
Project Manager	4.00	HR	0.00	128.05	0.00	$512	
Project Engineer	30.00	HR	0.00	112.30	0.00	$3,369	
Project Scientist	101.00	HR	0.00	71.81	0.00	$7,253	
Staff Scientist	65.00	HR	0.00	66.93	0.00	$4,350	
Field Technician	75.00	HR	0.00	89.51	0.00	$6,713	Biological monitor and sampling
Word Processing/Clerical	30.00	HR	0.00	45.19	0.00	$1,356	
Draftsman/CADD	26.00	HR	0.00	82.85	0.00	$2,154	
SUBTOTAL ($2004)						**$37,706**	
SUBTOTAL ($2004)						$44,505	
Contingency		25%				$11,126	10% scope + 15% bid
SUBTOTAL ($2004)						**$55,631**	
Professional Labor							
Design and Work Plan		3.00%				$1,669	
Project Management Labor Cost		1.00%				$556	
Planning Documents Labor Cost		2.00%				$1,113	
Reporting Labor Cost		0.75%				$417	
Public Notice Labor Cost		0.25%				$139	
Site Closure Activities Labor Cost		0.25%				$139	
Permitting Labor Cost		1.00%				$556	
SUBTOTAL ($2004)						**$4,590**	
TOTAL CAPITAL COST IN 2004 DOLLARS						**$60,221**	

TABLE B-2 ALTERNATIVE 2 (MONITORING), TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, biological monitoring and groundwater motioring in the first year, groundwater monitoring until year 30.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
OPERATIONS AND MAINTENANCE COSTS:							
Groundwater Monitoring							Three samples will be collected
Disposable Materials per Sample	4.00	EA	12.47	0.00	0.00	$50	annually from 10 ft bgs (plus QC)
Decontamination Materials per Sample	4.00	EA	11.13	0.00	0.00	$45	
Nylon Tubing, 1/4" Outside Diameter	40.00	LF	0.65	0.00	0.00	$26	
Water Quality Parameter Testing Device, DO, Temp., pH, Conductivity, Salinity, Turbidity, Daily Rent	4.00	DAY	102.24	0.00	0.00	$409	
Total Dissolved Solids (EPA 160.1), Water Analysis	4.00	EA	25.69	0.00	0.00	$103	
Total Suspended Solids (EPA 160.2), Water Analysis	4.00	EA	25.69	0.00	0.00	$103	
Pesticides/PCBs (EPA 608), Water Analysis	4.00	EA	255.60	0.00	0.00	$1,022	
TAL Metals (EPA 6010/7000s), Water, Water Analysis	4.00	EA	200.00	0.00	0.00	$800	
Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)	4.00	EA	178.92	0.00	0.00	$716	
4" Submersible Pump Rental, Day	1.00	DAY	112.62	0.00	0.00	$113	
Well Development Equipment Rental (Daily)	1.00	DAY	211.81	0.00	0.00	$212	
Car or Van Mileage Charge	100.00	MI	0.53	0.00	0.00	$53	
Project Manager	4.00	HR	0.00	128.05	0.00	$512	
Project Engineer	16.00	HR	0.00	112.30	0.00	$1,797	
Project Scientist	40.00	HR	0.00	71.81	0.00	$2,872	
Staff Scientist	35.00	HR	0.00	66.93	0.00	$2,342	
Field Technician	50.00	HR	0.00	89.51	0.00	$4,475	Biological monitor and sampling
Word Processing/Clerical	7.00	HR	0.00	45.19	0.00	$316	
Draftsman/CADD	7.00	HR	0.00	82.85	0.00	$580	
SUBTOTAL ($2004)						**$16,546**	
TOTAL O&M COST IN 2004 DOLLARS						**$16,546**	
PERIODIC COSTS:							
Close-out Report	30	1	EA		$47,929	$47,929	
SUBTOTAL ($2004)						**$47,929**	

PRESENT VALUE ANALYSES:

Cost Type	Year	Total Cost	Total Cost per Year	Discount Factor[a,b]	Present Value	Notes
Capital Cost	0	$60,221	$60,221	1.0000	$60,221	
Annual O&M	1-30	$496,374	$16,546	18.3920	$304,311	
Periodic Cost	30	$47,929	$47,929	0.3563	$17,076	
		$604,524			**$381,608**	
TOTAL PRESENT VALUE OF ALTERNATIVE						**$381,608**

Notes:
Labor rates are based on STAECRU contract

[a] Discount factor = $\frac{1}{(1+i)^t}$ where i = 0.035 for a 30 year technology and t = year (i.e., the present value of the dollar paid in year t at 3.5%)

[b] Multi-year discount factor = $\frac{(1+i)^n - 1}{i(1+i)^n}$ where i = 0.035 for a 30 year technology, t = year, and n = total number of years (i.e., the present value of the dollar paid per year from year 1 to year n at 3.5%)

bgs	Below ground surface	LF	Linear foot
CADD	Computer aided drafting and design	LUC	Land use control
EA	Each	MI	Mile
EPA	U.S. environmental Protection Agency	O & M	Operation and Maintenance
HR	Hour	PCB	Polychlorinated biphenyl

TABLE B-3 ALTERNATIVE 3 (EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LUCS, HABITAT RESTORATION),
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, stabilization of soil debris, wetlands restoration. Groundwater monitoring and land use controls for 30 years to monitor the integrity of the cap and stabilization of debris.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
CAPITAL COSTS							
Pre-excavation Sampling for PCBs							5 soil samples collected
Hand Auger Rental	1.00	DAY	23.74	0.00	0.00	$24	from 2 feet bgs
Soil Moisture Content ASTM D2216	5.00	EA	41.48	0.00	0.00	$207	
Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	5.00	EA	291.91	0.00	0.00	$1,460	
Car or Van Mileage Charge	100.00	MI	0.61	0.00	0.00	$61	
Project Scientist	23.00	HR	0.00	172.99	0.00	$3,979	
Field Technician	7.00	HR	0.00	114.12	0.00	$799	
Word Processing/Clerical	3.00	HR	0.00	89.96	0.00	$270	
Draftsman/CADD	3.00	HR	0.00	117.96	0.00	$354	
SUBTOTAL ($2004)						**$6,799**	
Preconstruction Activities							
Fence, 6' High	300.00	LF	11.95	18.71	0.00	$9,198	Mouse-proof fence
Hazardous Waste Signing	2.00	EA	24.78	108.92	0.00	$267	
Mobilize Equipment (Wetlands)	1.00	LS	7,861.32	0.00	0.00	$7,861	
Biological Monitor	20.00	HR	0.00	66.93	0.00	$1,339	Monitor SMHM and pickleweed
Locate Underground Utilities	1.00	LS	0.00	2000.00	0.00	$2,000	
Truck Scale Rental	1.50	MO	4716.79	0.00	0.00	$7,075	
Portable Ambient Air Analyzer	1.50	MO	2158.20	0.00	0.00	$3,237	
Health and Safety Program	1.00	LS	0.00	50000.00	0.00	$50,000	
Well Abandonment, 2" Well	30.00	LF	1.02	15.07	18.40	$1,035	Existing wells removed from
SUBTOTAL ($2004)						**$82,012**	excavation area
Haul Road Construction							
Medium Brush, Medium Trees, Clear, Grub, Haul	0.83	ACRE	0.00	11063.33	3622.84	$12,190	
Rough Grading, 14G, 1 Pass	11333.33	SY	0.00	1.14	1.09	$25,273	
Compact Subgrade, 2 Lifts	2833.33	CY	0.00	0.52	0.38	$2,550	
Build Temporary Railroad Crossing[a]	1.00	LS	0.00		0.00	$5,000	cost supplied by railroad
Flagman[a]	120.00	HR	0.00	75.00	0.00	$9,000	cost supplied by railroad
SUBTOTAL ($2004)						**$54,013**	
Preliminary Site Construction							
Medium Brush without Grub, Clearing	1.00	ACRE	0.00	251.05	101.42	$352	Clear and grub staging area
Dozer 105 HP D5, Grubbing & Stacking	121.00	CY	0.00	8.60	4.84	$1,626	Clear and grub staging area
Soloco Mat Rental, one Month with Transport, Install and Remove	44.00	EA	416.57	0.00	0.00	$18,329	10% coverage
Biological Monitor	20.00	HR	0.00	66.93	0.00	$1,339	SMHM trap, remove and monitor
Aqua-Barriers, 8 feet tall by 100 feet long, 2-month lease[b]	6.00	UNITS	17383.33	0.00	0.00	$104,300	Dewatering area barrier (quote)
4" Diameter Contractor's Trash Pump,	20.00	DAY	95.86	40.56	0.00	$2,728	For dewatering
4" Polyethylene (SDR 21) Piping	100.00	LF	1.49	21.87	1.40	$2,476	For dewatering
3 CY, Crawler-mounted, Hydraulic Excavator	5,925.93	CY	0.00	2.74	1.83	$27,081	Excavation of disposal area
Disposable Materials per Sample	3.00	EA	12.14	0.00	0.00	$36	Suitablilty for wetlands
Soil Moisture Content ASTM D2216	3.00	EA	35.38	0.00	0.00	$106	Suitablilty for wetlands
TAL Metals (EPA 6010/7000s), Soil Analysis	3.00	EA	200.00	0.00	0.00	$600	Suitablilty for wetlands
Particle Size Analysis	3.00	EA	100.00	0.00	0.00	$300	Suitablilty for wetlands
Total Organic Carbon, TOC (EPA 9060), Soil Analysis	3.00	EA	42.83	0.00	0.00	$128	Suitablilty for wetlands
Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	3.00	EA	443.05	0.00	0.00	$1,329	Suitablilty for wetlands
Plastic Laminate Waste Pile Cover	60,245.64	SF	0.17	0.06	0.00	$13,856	
Decontaminate Heavy Equipment	1.00	EA	0.00	924.05	0.00	$924	
SUBTOTAL ($2004)						**$175,513**	
Excavation of Debris							Assume 3 ft average depth
3 CY, Crawler-mounted, Hydraulic Excavator	3,333.33	CY	0.00	2.74	1.83	$15,233	
Biological Monitor	40.00	HR	0.00	66.93	0.00	$2,677	SMHM monitor
4" Diameter Contractor's Trash Pump, 300 GPM	25.00	DAY	95.86	40.56	0.00	$3,411	
Disposable Materials per Sample	50.00	EA	12.14	0.00	0.00	$607	confirmation sampling
Soil Moisture Content ASTM D2216	50.00	EA	35.38	0.00	0.00	$1,769	confirmation sampling
TAL Metals (EPA 6010/7000s), Soil Analysis	50.00	EA	200.00	0.00	0.00	$10,000	confirmation sampling
Plastic Laminate Waste Pile Cover	50,004.24	SF	0.17	0.06	0.00	$11,501	
Decontaminate Heavy Equipment	1.00	EA	0.00	924.05	0.00	$924	
SUBTOTAL ($2004)						**$46,122**	

TABLE B-3 ALTERNATIVE 3 (EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LUCS, HABITAT RESTORATION),
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, stabilization of soil debris, wetlands restoration. Groundwater monitoring and land use controls for 30 years to monitor the integrity of the cap and stabilization of debris.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
Transportation and Disposal of Debris Onsite							
988, 7.0 CY, Wheel Loader	80.00	HR	0.00	113.75	219.77	$26,682	
50 Ton, 773, Off-highway Truck	80.00	HR	0.00	89.76	279.89	$29,572	
SUBTOTAL ($2004)						**$56,254**	
Stabilization							
Biological Monitor	100.00	HR	0.00	66.93	0.00	$6,693	SMHM monitor
910, 1.25 CY, Wheel Loader	100.00	HR	0.00	107.75	43.47	$15,122	
12 CY, Dump Truck	100.00	HR	0.00	89.76	0.00	$8,976	
550 Gallon, Stainless Steel Aboveground Wastewater Holding Tank, Rental	1.00	MO	448.10	0.00	0.00	$448	
21,000 Gallon Steel, Open Top, Tank Rental	1.00	MO	1,721.63	0.00	0.00	$1,722	
Portland Cement Type I (Bulk)	931.50	TON	122.53	0.00	0.00	$114,137	
Urrichem Proprietary Additive (Bulk)	62.10	TON	1,683.65	0.00	0.00	$104,555	
1 CY Plywood Boxes	18.00	EA	39.42	85.07	0.00	$2,241	
Operational Labor for Process Equipment	100.00	HR	0.00	99.40	0.00	$9,940	
Bulk Chemical Transport (40,000 Lb Truckload)	51.00	EA	3,562.75	0.00	0.00	$181,700	
15 CY Waste Mixer	1.00	MO	8,017.08	0.00	0.00	$8,017	
Solidification/Stabilization Ancillary Equipment	1.00	EA	12,197.90	0.00	0.00	$12,198	
Maintenance of Solidification/Stabilization Unit	0.05	YR	0.00	15,506.92	0.00	$775	
DOT Steel Drum, 55 Gallon	4.00	EA	114.10	0.00	0.00	$456	
Diesel Fuel	409.00	GAL	1.62	0.00	0.00	$663	
Process Water, Supplied by Tanker Truck	90.00	KGAL	14.42	0.00	0.00	$1,298	
Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	1,889.45	CY	0.00	3.42	2.65	$11,469	Disposal cell cover from excavation of disposal area
SUBTOTAL ($2004)						**$480,409**	
Installation of Two Groundwater Monitoring Wells[a]							installed to 15 feet bgs,
Organic Vapor Analyzer Rental, per Day	1.00	DAY	194.61	0.00	0.00	$195	screened 5-10 feet bgs
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	191.54	0.00	0.00	$192 $0	
Field Technician	16.00	HR	0.00	114.12	0.00	$1,826	
2" PVC, Schedule 40, Well Casing	30.00	LF	1.91	7.54	12.37	$655	
2" PVC, Schedule 40, Well Screen	10.00	LF	4.42	9.73	15.95	$301	
2" PVC, Well Plug	2.00	EA	9.31	11.31	18.55	$78	
Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	32.00	LF	0.00	20.68	33.91	$1,747 $0	
2" Screen, Filter Pack	14.00	LF	4.97	6.41	10.51	$306	
2" Well, Portland Cement Grout	14.00	LF	1.85	0.00	0.00	$26	
2" Well, Bentonite Seal	2.00	EA	14.76	25.45	41.73	$164	
Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	2262.38	3709.51	$5,972	
Surface Pad, Concrete, 2' x 2' x 4"	2.00	EA	64.65	235.11	10.45	$620	
SUBTOTAL ($2004)						**$12,081**	
Cover for Disposal Cell[a]							
Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	1,595.93	CY	8.58	3.90	2.60	$24,067	
Loam or topsoil, imported topsoil, 6" deep, furnish and place	312.18	LCY	29.26	10.64	2.03	$13,090	
Seeding, Vegetative Cover	0.30	ACRE	26,802.60	784.44	179.83	$8,330	
SUBTOTAL ($2004)						**$45,486**	

TABLE B-3 ALTERNATIVE 3 (EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LUCS, HABITAT RESTORATION),
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, stabilization of soil debris, wetlands restoration. Groundwater monitoring and land use controls for 30 years to monitor the integrity of the cap and stabilization of debris.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
Wetlands Restoration							
Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	4,333.33	CY	0.00	3.42	2.65	$26,303	From excavation of disposal area
General Area Cleanup	1.00	ACRE	0.00	599.66	58.26	$658	
Silt Fences, Vinyl, 3' High with 7.5' Posts	500.00	LF	0.97	4.65	0.00	$2,810	
Growing Plants in Greenhouse, Planting[c]	14000.00	PLANTS	2.00	0.50	0.00	$35,000	plant on 2' centers
SUBTOTAL ($2004)						**$64,771**	
Post Construction Activities							
Removal of Temporary Railroad Crossing[a]	1.00	LS				$5,000	
Cat 215, 1.0 CY, Soil, Shallow, Trenching	8.01	CY	0.00	1.58	0.89	$20	removal of trench crossing
Backfill with Excavated Material	10.80	CY	0.47	8.06	1.12	$104	removal of trench crossing
Delivered & Dumped, Backfill with Stone	2.01	BCY	35.81	1.79	1.24	$78	removal of trench crossing
Demobilize Equipment (Wetlands)	1.00	LS	7,861.32	0.00	0.00	$7,861	
SUBTOTAL ($2004)						**$13,063**	
Land Use Controls							
Land Use Control Implementation Plan						$39,625	
Environmental Restrictions in Deed						$31,470	
Register and File Deed						$133	
Navy Oversight	25%					$17,807	
SUBTOTAL ($2004)						**$89,035**	
SUBTOTAL ($2004)						$1,214,595	
Contingency	25%					$303,649	10% scope + 15% bid
SUBTOTAL ($2004)						**$1,518,244**	
Professional Labor							
Design and Work Plan	3.00%					$45,547	
Project Management Labor Cost	1.00%					$15,182	
Planning Documents Labor Cost	2.00%					$30,365	
Construction Oversight Labor Cost	3.25%					$49,343	
Reporting Labor Cost	0.75%					$11,387	
As-Built Drawings Labor Cost	0.75%					$11,387	
Public Notice Labor Cost	0.25%					$3,796	
Site Closure Activities Labor Cost	0.25%					$3,796	
Permitting Labor Cost	1.00%					$15,182	
SUBTOTAL ($2004)						$185,985	
TOTAL CAPITAL COST IN 2004 DOLLARS						**$1,704,228**	
OPERATIONS AND MAINTENANCE COSTS:							
Land Use Controls							
Annual Drive-by Inspection						$2,478	includes evaluation of cap integrity
Contingency	25%					$620	annually for 3 years
Navy Oversight	25%					$620	
SUBTOTAL ($2004)						**$3,717**	
Groundwater Monitoring							Two samples will be collected
Disposable Materials per Sample	3.00	EA	12.47	0.00	0.00	$37	annually from 10 ft bgs (plus QC)
Decontamination Materials per Sample	3.00	EA	11.13	0.00	0.00	$33	
Nylon Tubing, 1/4" Outside Diameter	30.00	LF	0.65	0.00	0.00	$20	
Water Quality Parameter Testing Device, DO, Temp., pH, Conductivity, Salinity, Turbidity, Daily Rent	3.00	DAY	102.24	0.00	0.00	$307	
Total Dissolved Solids (EPA 160.1), Water Analysis	3.00	EA	25.69	0.00	0.00	$77	
Total Suspended Solids (EPA 160.2), Water Analysis	3.00	EA	25.69	0.00	0.00	$77	
Pesticides/PCBs (EPA 608), Water Analysis	3.00	EA	255.60	0.00	0.00	$767	
TAL Metals (EPA 6010/7000s), Water, Water Analysis	3.00	EA	200.00	0.00	0.00	$600	
Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)	3.00	EA	178.92	0.00	0.00	$537	
4" Submersible Pump Rental, Day	1.00	DAY	112.62	0.00	0.00	$113	
Well Development Equipment Rental (Daily)	1.00	DAY	211.81	0.00	0.00	$212	
Car or Van Mileage Charge	100.00	MI	0.53	0.00	0.00	$53	
Project Manager	4.00	HR	0.00	128.05	0.00	$512	
Project Engineer	8.00	HR	0.00	112.30	0.00	$898	
Project Scientist	8.00	HR	0.00	71.81	0.00	$574	
Staff Scientist	16.00	HR	0.00	66.93	0.00	$1,071	
Field Technician	20.00	HR	0.00	89.51	0.00	$1,790	
Word Processing/Clerical	5.00	HR	0.00	45.19	0.00	$226	
Draftsman/CADD	5.00	HR	0.00	82.85	0.00	$414	
SUBTOTAL ($2004)						**$8,318**	

TABLE B-3 ALTERNATIVE 3 (EXCAVATION, STABILIZATION, ON-SITE DISPOSAL, LUCS, HABITAT RESTORATION),
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, stabilization of soil debris, wetlands restoration. Groundwater monitoring and land use controls for 30 years to monitor the integrity of the cap and stabilization of debris.

DESCRIPTION		Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
PERIODIC COSTS:								
Five Year Review	5	1.00	EA	0.00	18903.70	0.00	$18,904	
SUBTOTAL ($2004)							**$18,904**	

PRESENT VALUE ANALYSES:

Cost Type	Year	Total Cost	Total Cost per Year	Discount Factor[d,e]	Present Value	Notes
Capital Cost	0	$1,704,228	$1,704,228	1.0000	$1,704,228	
Annual O&M	1-3	$24,955	$8,318	2.8016	$10,414	groundwater monitoring
Annual O&M	1-30	$111,510	$3,717	18.3920	$347,678	LUCs
Periodic Cost	5	$18,904	$18,904	0.8420	$15,916	
		$1,859,597			**$2,078,236**	

TOTAL PRESENT VALUE OF ALTERNATIVE **$2,078,236**

Notes:

Labor rates are based on STAECRU contract

[a] Cost supplied by railroad

[b] Vender quote supplied by Kathy Sullivan of Hydro Solutions, Inc. 800/245-0199 on October 14, 2004

[c] Vendor quote supplied by Pacific OpenSpace, Inc. 707/769-1213 on October 14, 2004

[d] Discount factor = $\frac{1}{(1+i)^t}$ where i = 0.035 for a 30+ year technology and t = year (i.e., the present value of the dollar paid in year t at 3.5%)

[e] Multi-year discount factor = $\frac{(1+i)^n - 1}{i(1+i)^n}$ where i = 0.035 for a 30+ year technology, t = year, and n = total number of years (i.e., the present value of the dollar paid per year from year 1 to year n at 3.5%)

bgs	Below ground surface	LF	Linear foot
CADD	Computer aided drafting and design	LS	Lump sum
CY	Cubic yard	LUC	Land use control
EA	Each	MI	Mile
EPA	U.S. environmental Protection Agency	MO	Month
GAL	Gallon	O & M	Operation and Maintenance
GPM	Gallons per minute	PCB	Polychlorinated biphenyl
HR	Hour	QC	Quality control
KGAL	Thousand gallons	SY	Square yard
LCY	Loose cubic yard	YR	Year

TABLE B-4 ALTERNATIVE 4 (EXCAVATION, OFF-SITE DISPOSAL, HABITAT RESTORATION).
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, off-site disposal of soil debris, and wetlands restoration.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
OPERATIONS AND MAINTENANCE COSTS:							
Pre-excavation Sampling for PCBs							5 soil samples collected
Hand Auger Rental	1.00	DAY	23.74	0.00	0.00	$24	from 2 feet bgs
Soil Moisture Content ASTM D2216	5.00	EA	41.48	0.00	0.00	$207	
Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	5.00	EA	291.91	0.00	0.00	$1,460	
Car or Van Mileage Charge	100.00	MI	0.61	0.00	0.00	$61	
Project Scientist	23.00	HR	0.00	172.99	0.00	$3,979	
Field Technician	7.00	HR	0.00	114.12	0.00	$799	
Word Processing/Clerical	3.00	HR	0.00	89.96	0.00	$270	
Draftsman/CADD	3.00	HR	0.00	117.96	0.00	$354	
SUBTOTAL ($2004)						**$6,799**	
Preconstruction Activities							
Fence, 6' High, Wood	300.00	LF	11.95	18.71	0.00	$9,198	Mouse-proof fence
Hazardous Waste Signing	2.00	EA	24.78	108.92	0.00	$267	
Mobilize Equipment (Wetlands)	1.00	LS	7,861.32	0.00	0.00	$7,861	
Biological Monitor	20.00	HR	0.00	66.93	0.00	$1,339	Monitor SMHM and pickleweed
Locate Underground Utilities	1.00	LS	0.00	2000.00	0.00	$2,000	
Truck Scale Rental	1.00	MO	4716.79	0.00	0.00	$4,717	
Portable Ambient Air Analyzer	1.00	MO	2158.20	0.00	0.00	$2,158	
Health and Safety Program	1.00	LS	0.00	50000.00	0.00	$50,000	
Well Abandonment, 2" Well	30.00	LF	1.02	15.07	18.40	$1,035	Existing wells removed from
SUBTOTAL ($2004)						**$78,575**	excavation area
Haul Road Construction							
Medium Brush, Medium Trees, Clear, Grub, Haul	0.83	ACRE	0.00	11063.33	3622.84	$12,190	
Rough Grading, 14G, 1 Pass	11333.33	SY	0.00	1.14	1.09	$25,273	
Compact Subgrade, 2 Lifts	2833.33	CY	0.00	0.52	0.38	$2,550	
Build Temporary Railroad Crossing[a]	1.00	LS	0.00	0.00	0.00	$5,000	cost supplied by railroad
Flagman[a]	120.00	HR	0.00	75.00	0.00	$9,000	cost supplied by railroad
SUBTOTAL ($2004)						**$54,013**	
Preliminary Site Construction							
Medium Brush without Grub, Clearing	1.00	ACRE	0.00	251.05	101.42	$352	Clear and grub staging area
Dozer 105 HP D5, Grubbing & Stacking	121.00	CY	0.00	8.60	4.84	$1,626	Clear and grub staging area
Soloco Mat Rental, one Month with Transport, Install and Remove	44.00	EA	416.57	0.00	0.00	$18,329	10% coverage
Biological Monitor	20.00	HR	0.00	66.93	0.00	$1,339	SMHM trap, remove and monitor
Aqua-Barriers, 8 feet tall by 100 feet long, 45-day lease[b]	6.00	UNITS	17383.33	0.00	0.00	$104,300	Dewatering area barrier
4" Diameter Contractor's Trash Pump,	20.00	DAY	95.86	40.56	0.00	$2,728	For dewatering
4" Polyethylene (SDR 21) Piping	100.00	LF	1.49	21.87	1.40	$2,476	For dewatering
SUBTOTAL ($2004)						**$131,151**	
Excavation of Debris							Assume 3 ft average depth
3 CY, Crawler-mounted, Hydraulic Excavator	3,333.33	CY	0.00	2.74	1.83	$15,233	
Biological Monitor	40.00	HR	0.00	66.93	0.00	$2,677	SMHM monitor
4" Diameter Contractor's Trash Pump, 300 GPM	25.00	DAY	95.86	40.56	0.00	$3,411	
Disposable Materials per Sample	50.00	EA	12.14	0.00	0.00	$607	
Soil Moisture Content ASTM D2216	50.00	EA	35.38	0.00	0.00	$1,769	
TAL Metals (EPA 6010/7000s), Soil Analysis	50.00	EA	200.00	0.00	0.00	$10,000	
TCLP (RCRA) (EPA 1311), Soil Analysis	1.00	EA	200.00	0.00	0.00	$200	
Plastic Laminate Waste Pile Cover	50,004.24	SF	0.17	0.06	0.00	$11,501	
Decontaminate Heavy Equipment	1.00	EA	0.00	924.05	0.00	$924	
SUBTOTAL ($2004)						**$46,322**	
Preparation and Drying of Debris							
Medium Brush without Grub, Clearing	2.75	ACRE	0.00	230.96	113.88	$948	
Dozer 105 HP D5, Grubbing & Stacking	332.75	CY	0.00	7.92	5.44	$4,446	
4" Unreinforced Slab on Grade	12000.00	SF	2.08	3.75	0.23	$72,720	
3 CY, Crawler-mounted, Hydraulic Excavator	4333.33	CY	0.00	2.74	1.83	$19,803	
4" Diameter Contractor's Trash Pump, 300 GPM	2.00	DAY	95.86	40.56	0.00	$273	
Plastic Laminate Waste Pile Cover	15000.00	SF	0.18	0.05	0.00	$3,450	
SUBTOTAL ($2004)						**$101,640**	
Transportation and Disposal of Debris Offsite[c]							
T & D of Debris to a Class I Facility, Assuming RCRA Stabilization for Lead	3608.73	TON	0.00	190.00	0.00	$685,659	Assuming TCLP > 5 ppm Pb
T & D of Debris to a Class I Facility, Assuming Cal-Haz Material	0.00	TON	0.00	80.00	0.00	$0	Assuming TCLP < 5 ppm Pb
T & D of Debris to a Class II Facility	1546.60	TON	0.00	55.00	0.00	$85,063	Assuming STLC < 5 ppm Pb
SUBTOTAL ($2004)						**$770,722**	

TABLE B-4 ALTERNATIVE 4 (EXCAVATION, OFF-SITE DISPOSAL, HABITAT RESTORATION).
TOTAL REMOVAL ACTION COST SUMMARY
Engineering Evaluation/Cost Analysis, Site 30, Taylor Boulevard Bridge, Naval Weapons Station Seal Beach Detachment Concord, CA

COST ESTIMATE SUMMARY

Site: Site 30, Taylor Boulevard Bridge
Location: Naval Weapons Station Seal Beach Detachment Concord, CA
Phase: Engineering Evaluation/Cost Analysis
Base Year: 2004
Date: September 2004

Description: Sampling for PCBs in soil, excavation of soil debris area, drying of soil debris, off-site disposal of soil debris, and wetlands restoration.

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Notes
Wetlands Restoration							
Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	4333.33	CY	7.00	3.42	2.65	$56,637	assume additional 30% for compaction
General Area Cleanup	1.00	ACRE	0.00	599.66	58.26	$658	
Silt Fences, Vinyl, 3' High with 7.5' Posts	500.00	LF	0.97	4.65		$2,810	
Growing Plants in Greenhouse, Planting [d]	14000.00	PLANTS	2.00	0.50	0.00	$35,000	plant on 2' centers
SUBTOTAL ($2004)						**$95,105**	
Post Construction Activities							
Removal of Temporary Railroad Crossing [a]	1.00	LS				$5,000	
Cat 215, 1.0 CY, Soil, Shallow, Trenching	8.01	CY	0.00	1.58	0.89	$20	removal of trench crossing
Backfill with Excavated Material	10.80	CY	0.47	8.06	1.12	$104	removal of trench crossing
Delivered & Dumped, Backfill with Stone	2.01	BCY	35.81	1.79	1.24	$78	removal of trench crossing
Demobilize Equipment (Wetlands)	1.00	LS	7,861.32	0.00	0.00	$7,861	
SUBTOTAL ($2004)						**$13,063**	
SUBTOTAL ($2004)						$1,297,389	
Contingency	25%					$324,347	10% scope + 15% bid
SUBTOTAL ($2004)						**$1,621,737**	
Professional Labor							
Design and Work Plan	3.00%					$48,652	
Project Management Labor Cost	1.00%					$16,217	
Planning Documents Labor Cost	2.00%					$32,435	
Construction Oversight Labor Cost	3.25%					$52,706	
Reporting Labor Cost	0.75%					$12,163	
As-Built Drawings Labor Cost	0.75%					$12,163	
Public Notice Labor Cost	0.25%					$4,054	
Site Closure Activities Labor Cost	0.25%					$4,054	
Permitting Labor Cost	1.00%					$16,217	
SUBTOTAL ($2003)						**$198,663**	
TOTAL CAPITAL COST IN 2004 DOLLARS						**$1,820,399**	

OPERATIONS AND MAINTENANCE COSTS:

Pickleweed Regrowth Monitoring							
Annual Inspection						$2,478	
TOTAL O&M COST IN 2004 DOLLARS						**$2,478**	

PERIODIC COSTS:

Remedial Action Report	3	1.00	EA	0.00	47928.91	0.00	$47,929
SUBTOTAL ($2004)							**$47,929**

PRESENT VALUE ANALYSES:

Cost Type	Year	Total Cost	Total Cost per Year	Discount Factor [e,f]	Present Value	Notes
Capital Cost	0	$1,820,399	$1,820,399	1.0000	$1,820,399	
Annual O&M	1-3	$7,434	$2,478	2.9065	$7,202	
Periodic Cost	3	$47,929	$47,929	0.9535	$45,700	
		$1,875,762			**$1,873,302**	
TOTAL PRESENT VALUE OF ALTERNATIVE					**$1,873,302**	

Notes:
Labor rates are based on the STAECRU contract
[a] Cost supplied by railroad
[b] Vender quote supplied by Kathy Sullivan of Hydro Solutions, Inc. 800/245-0199 on October 14, 2004
[c] Quote from Brian Mansfield at Chem Waste Management-Kettleman Hills (916/439-2577). October 2004
[d] Vendor quote supplied by Pacific OpenSpace, Inc. 707/769-1213 on October 14, 2004
[e] Discount factor = $\frac{1}{(1+i)^t}$ where i = 0.016 for a 3 year technology and t = year (i.e., the present value of the dollar paid in year t at 1.6%)
[f] Multi-year discount factor = $\frac{(1+i)^n - 1}{i(1+i)^n}$ where i = 0.016 for a 3 year technology, t = year, and n = total number of years (i.e., the present value of the dollar paid per year from year 1 to year n at 1.6%)

bgs	Below ground surface	LF	Linear foot
BCY	Bank cubic yards	LS	Lump sum
CADD	Computer aided drafting and design	LUC	Land use control
CY	Cubic yard	MI	Mile
EA	Each	MO	Month
EPA	U.S. environmental Protection Agency	O & M	Operation and Maintenance
GAL	Gallon	PCB	Polychlorinated biphenyl
GPM	Gallons per minute	QC	Quality control
HR	Hour	RCRA	Resource Conservation Recovery Act
KGAL	Thousand gallons	SY	Square yard
LCY	Loose cubic yard	TCLP	Toxic Charicteristic Leaching Procedure
		YR	Year

APPENDIX C
RESPONSES TO AGENCY COMMENTS ON THE DRAFT REPORT

RESPONSES TO REGULATORY AGENCY COMMENTS ON DRAFT ENGINEERING EVALUATION/COST ANALYSIS, NON-TIME CRITICAL REMOVAL ACTION FOR TAYLOR BOULEVARD BRIDGE DISPOSAL SITE (SITE 30) NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD CONCORD, CALIFORNIA

This document presents the U.S. Department of the Navy's responses to comments from the U.S. Environmental Protection Agency (EPA); the California Regional Water Quality Control Board (Water Board); the Restoration Advisory Board (RAB) Community Co-chair, Mary Lou Williams; Clearwater Revival Company (CRC) (on behalf of the Concord Naval Weapons Station – Local Reuse Association [LRA]); and the California Department of Fish and Game, Office of Spill Prevention and Response (DFG-OSPR), on the *Draft Engineering Evaluation/Cost Analysis Non-Time Critical Removal Action for Taylor Boulevard Bridge Disposal Site (Site 30), Naval Weapons Station Seal Beach Detachment Concord, Concord, California*, dated November 24, 2004. Comments were received from EPA on January 26, 2005, from the Water Board on January 27, 2005, from the RAB community co-chair on January 10, 2005, from CRC on January 25, 2005, and from the DFG-OSPR on February 4, 2005.

RESPONSES TO EPA COMMENTS

GENERAL COMMENTS

1. Comment: **In U.S. EPA's August 26, 2004, comments on a June 2004, Draft Final Remedial Investigation Addendum (or RI Addendum), the Navy was requested to conduct a limited pre-removal action sampling event to evaluate the extent of Polychlorinated Biphenyls (PCBs) contamination of sediment, in order to adequately assess associated ecological risks and confirm the risk footprint. However, pre-removal sampling is not discussed in this EE/CA. Since the Navy has not yet adequately assessed ecological risks associated with PCB contamination, please revise the EE/CA to include limited pre-removal sampling to confirm that the risk footprint addresses PCBs, as well as lead and other contaminants.**

Response: The Navy will collect pre-excavation samples to analyze for PCBs. The final engineering evaluation and cost analysis (EE/CA) will be revised to incorporate a discussion of the pre-excavation sampling.

2. Comment: **In the Draft EE/CA, numerical removal action objectives (RAOs) are established for lead and polycyclic aromatic hydrocarbons (PAHs) only, while (post-removal) confirmation samples are proposed to be analyzed for only lead. It is not clear from the information presented in the EE/CA that RAOs for lead and PAHs will also address arsenic, cadmium, copper, chromium, mercury, selenium, and zinc. It is also not clear how it will be determined if the RAO for PAHs has been attained if only lead analysis is performed on confirmation samples.**

Response: An analysis of the sampling data from the remedial investigation (RI) (Tetra Tech 2002) and RI addendum (Tetra Tech 2004) indicated that all chemicals of potential ecological concern (COPEC) were collocated with elevated concentrations of lead at the site. A data summary table and figure showing how lead is collocated with the other COPECs will be added to the EE/CA. The final EE/CA will not include a RAO for PAHs, however, because PAHs were also collocated with lead.

3. **Comment:** **The summary of investigation results presented in the EE/CA is not clear. The distribution and concentration of contaminants is summarized in very general terms. For example, the depth and concentrations of contaminants at each location are not provided; therefore, it is difficult to evaluate the effectiveness of the alternatives presented. Please revise the EE/CA to include a figure or figures summarizing RI data, including the depth and concentration of contaminants at each location.**

Response: The RI report (Tetra Tech 2002) and RI addendum (Tetra Tech 2004) provided a detailed description of the distribution and concentration of contaminants at the site. Table 4 will be revised in the final EE/CA to summarize relevant data from the RI.

4. **Comment:** **The extent of contamination near sample location SB201 remains undefined; however, the risk footprint assumes that the contamination does not extend beyond this point. It appears that limited pre-excavation sampling would allow the extent of contamination in this area to be better defined and the removal action better directed. Please revise the EE/CA to include pre-excavation sampling to define the extent of contamination to the west, north and south of SB201.**

Response: Text in the EE/CA will be revised to emphasize the role of the confirmation sampling program for the removal action. The Navy understands that confirmation samples collected during the removal action would ensure that the RAOs for the site are achieved. If the results for the confirmation samples indicate that contamination remains at the post-removal perimeter of boring SB201, then the removal action in the area would be expanded until RAOs are achieved.

5. **Comment:** **The Navy's Draft EE/CA does not include a "containment" - removal action alternative that was discussed and recommended by the U.S. EPA during Site 30 removal action scoping discussions; however, this omission is not fatal. U.S. EPA had requested that the Navy consider an on-site containment cap removal action alternative consisting of a soil cap and sheet piling or slurry wall. Given that a containment cap alternative does not address the Navy's goal of achieving a No-Further Action decision and unrestricted reuse for the site, the three-four removal action alternatives under development by the Navy (i.e., No-Action; Monitoring; On-Site solidification/stabilization; and, Excavation, Off-Site Disposal, and Backfill) are considered sufficient for**

the EE/CA. U.S. EPA does request that the Navy create separate alternatives to address No-Action and Monitoring.

Response: No action and monitoring will be evaluated as separate alternatives in the final EE/CA. Section 4.0 in the final EE/CA will be revised to discuss the containment option as follows: "When the removal alternatives were developed, either containing the waste using a sheet pile wall or stabilizing the waste in place was also considered. These two options were eliminated based on the following concerns:

1. "The pickleweed habitat is extremely sensitive to changes in elevation. Simply containing the groundwater (by using a sheet pile wall around the source of the waste) will not meet the RAOs developed for the site. Instead, a 2- to 3-foot 'cap' over the contaminated area would be required to prevent ecological receptors from contacting COPCs [chemicals of potential concern] and COECs [chemicals of potential ecological concern]. This cap will raise the elevation of the area and reduce the amount of habitat available to the SMHM [salt marsh harvest mouse], a federally listed endangered species.

2. "An in situ stabilization effort will increase the volume by 20 to 25 percent, raising the elevation of the site. This change in elevation will reduce the amount of habitat available to the SMHM."

SPECIFIC COMMENTS

1. Comment: **<u>Section 2.3.3 Contaminant Fate and Transport, Page 12</u>: This section states that "it appears that chemicals have not migrated vertically by leaching as evidenced by the lack of soil contamination at depths below 1 foot [below ground surface]"; however, this statement contradicts information in Section 2.3.2 that the sediment data suggest that leaching from the debris to subsurface sediment may be occurring in low-lying areas of the site closest to the shoreline. Please correct this discrepancy.**

Response: The sentence referenced in the comment will be revised as follows in the final EE/CA: "except for the peninsula or areas directly adjacent to the shoreline, chemicals have not migrated vertically by leaching as evidenced by the lack of soil contamination at depths below 1 foot [below ground surface.]"

2. Comment: **<u>Section 2.4.1 Summary of Human Health Risk Evaluation, Page 13</u>: For the screening evaluation, Site 30 was divided into Areas A and B; however, these areas are not shown on a Figure. Please revise the EE/CA to clarify whether Area A, defined by the 400 mg/kg isopleth for lead, is the same as the risk footprint shown on Figure 5.**

Response: Area A is within the risk footprint. Figure 6 shows the locations where concentrations of lead exceed 400 milligrams per kilogram (mg/kg) (designated using the * symbol). As shown on Figure 6, all locations that exceeded 400

mg/kg were within the risk footprint. The final EE/CA will be modified for clarification.

3. Comment: **<u>Section 2.4.1 Summary of Human Health Risk Evaluation, Page 14</u>: This section states that concentrations of contaminants of potential concern (COPCs) in the remaining soil and sediment (outside the risk footprint) would be within U.S. EPA's target levels considered protective of human health. But in the same paragraph, it states that after soil and sediment are remediated within the risk footprint, arsenic would remain at concentrations above EPA Region 9 residential preliminary remediation goal (PRGs). These statements appear to be contradictory. Please revise this section to clarify that the risk footprint, as presented, does not address all areas of risk.**

Response: The final EE/CA will be revised as follows: "Although arsenic would remain at concentrations above the EPA Region 9 preliminary remediation goals after remediation, concentrations would be below the Tidal Area ambient value (27 mg/kg) at all locations."

4. Comment: **<u>Section 2.4.2 Summary of Ecological Risk Evaluation, Page 15</u>: At the bottom of this page, it indicates that the location of risk to each receptor was used to help establish the boundary for remedial action; however, the risk footprint shown on Figure 5 is the 400 mg/kg isopleth for lead. It bears no relationship to the areas of ecological risk and was not changed to address areas identified in the ecological risk evaluation. Two points, SB100 and SB102 are identified as locations of "risk to birds", but they are outside the risk footprint. Please revise the risk footprint to take into account all areas of ecological risk in addition to the human health risk represented by the 400 mg/kg isopleth for lead.**

Response: The two locations were consciously omitted from the risk footprint because risk was indicated to birds only from selenium; however, the Navy has since decided to expand the excavation footprint to include the locations of borings SB100 and SB102 (Figure 6, final EE/CA). The corresponding increase in the potential volume of excavated material and its corresponding impact on the associated cost will be incorporated into the final EE/CA.

5. Comment: **<u>Section 3.2.4.2 Location-Specific ARARs, Page 19</u>: It is not clear why Sections 1908, 3511, and 5050 of the California Fish and Game Code were not retained as potential ARARs. For example, it is not clear how it can be known that Section 1908, prohibiting the taking of rare or endangered native plants, would not be an ARAR unless it is known that no rare or endangered native plants are present at the site; similarly, for fully protected birds and fully protected reptiles and amphibians. Please revise the EE/CA to clarify if an ecological survey was performed and which species were found to be present at the site or retain these Fish and Game Code sections as potential ARARs until the species present at the site are confirmed.**

Response: Ecological surveys for endangered plants on Naval Weapons Station Seal Beach Detachment Concord (NWS SBD) Concord are conducted under the Navy's Natural Resources Management Program (NRMP). Based on the results of the NRMP surveys, no rare or endangered native plants have been identified in the vicinity of Site 30. If the Navy were to discover rare or endangered native plants during implementation of the removal action, the Navy will comply with the substantive requirements of Section 1908 of the California Fish and Game Code. Similarly, the Navy has not observed any fully protected birds near Site 30, which are the subject of Fish and Game Code Section 3511. If any fully protected birds are discovered at the site, the Navy will comply with the substantive requirements of Section 3511. In addition, the Navy is not aware of the existence of any fully protected reptiles or amphibians at the site that are protected by Fish and Game Code Section 5050. If any fully protected reptiles or amphibians are discovered at the site, the Navy will comply with the substantive requirements of Section 5050.

6. Comment: **<u>Section 4.1 Mobilization/Demobilization, Page 26</u>: The discussion of the mitigation of impacts on the Salt Marsh Harvest Mouse (SMHM) includes proposals to trap and relocate SMHM prior to removal activities and to construct a mouse-proof fence. It should be noted that trapping of the SMHM may not be permitted. A method of removing SMHM from the site is hand removal of vegetation to eliminate habitat prior to the removal action. This may have impacts on the cost and schedule of the alternatives. Please revise the EE/CA to include only those methods of removing and protecting the SMHM that are acceptable to the United States Fish and Wildlife Service (USFWS) and California Fish and Game to ensure that those methods are reflected in the cost estimates and schedule for the alternatives.**

Response: Within a year prior to the start of the removal action, the Navy will survey for the presence or absence of the SMHM to evaluate whether coordination with USFWS is necessary. If SMHM are present on the site, the Navy will coordinate with the USFWS for concurrence on the plan for the removal that is adequately protective of the SMHM. The SMHM removal plan proposed for Site 30 is similar to a program implemented at Site 2, Naval Security Group Activity (NSGA) Skaggs Island in Sonoma County, California, and received the concurrence of the USFWS. Additionally, if the SMHM is found at the site, an independent biological monitor will be present at all times to monitor the removal action to ensure that the SMHM is protected. The draft EE/CA currently factors in the cost of the biological monitor. The final EE/CA will clarify that the biological monitor would be an "independent" function of the removal action.

7. Comment: **<u>Section 4.2 Excavation, Page 27</u>: The dewatering discussion states that dewatering will be limited to situations that require unobstructed dry access to the bottom of the excavation. It is not clear what is meant by this statement. It appears that, since debris will be identified visually during excavation, dewatering will be necessary to allow visual**

observation of the bottom to confirm that all debris has been removed. Please revise the EE/CA to clarify the method to be used to verify, visually, that all debris has been removed and under what circumstances dewatering will be required.

Response: The final EE/CA will be revised to include a separate discussion on dewatering as a component of the removal action alternatives. Advance dewatering will facilitate a relatively dry removal process to allow for the efficient collection of confirmation samples. Also, as part of Alternative 4; debris may need to be dewatered by one or more processes, including air drying, mixing, and gravity drainage after it has been excavated and before it is transported to a landfill.

8. Comment: **Section 4.3 Confirmation Sampling Program, Page 27: This section states that lead is the primary inorganic chemical of concern and that other COPC and contaminants of ecological concern (COECs) appear to be collocated with the lead contamination. However, the EE/CA does not provide justification for this statement. Please revise the EE/CA to include a discussion of the COPCs and COECs in order to justify the use of lead alone in the confirmation sampling program; or, preferably, include all COPCs and COECs in the confirmation sampling program, including any new COPCs identified during the requested pre-removal sampling.**

Response: A focused discussion and an associated reference figure will be incorporated into Section 4.4 of the final EE/CA. The discussion and figure will illustrate the Navy's understanding that the excavation of lead-contaminated debris effectively remediates the elevated concentrations of other COPECs and COECs associated with ecological risk at Site 30.

9. Comment: **Section 4.6.1.2 Compliance with ARARs/TBC Guidance - Alternative 2, Page 32: The third sentence of this section refers to pre-excavation sampling; however, pre-excavation sampling is not discussed anywhere in the EE/CA, and it is not clear if pre-excavation sampling is proposed. Please revise the EE/CA to clarify whether pre-excavation sampling will be performed and what it will consist of.**

Response: The Navy will collect pre-excavation samples to analyze for PCBs. The EE/CA will be revised to incorporate a discussion of the pre-excavation sampling. Please see the response to EPA General Comment 1.

10. Comment: **Section 4.6.1.2 Compliance with ARARs/TBC Guidance - Alternative 2, Page 32: The text indicates that, once stabilized, the waste should no longer be hazardous. In addition to the soluble toxicity criteria, California requires that any waste with a total lead concentration greater than 1000 ppm be handled as a non-RCRA hazardous waste. Substantial amounts of the material to be excavated during this effort may fall into that category and will require special handling and disposal at a landfill licensed to accept California non-RCRA hazardous waste.**

Please revise the text to include the California Total Toxicity Limit Concentration (TTLC) criteria.

Response: The EE/CA will be revised to include the total threshold limit concentrations (TTLC) criteria at California Code of Regulations Title 22, Section 66262.24(a)(2), which lists the TTLCs and the soluble threshold limit concentrations (STLCs) for non-Resource Conservation and Recovery Act (RCRA) hazardous waste.

11. Comment: **Section 4.6.1.2 Compliance with ARARs/TBC Guidance - Alternative 2, Page 33: This section considers the possible necessity of obtaining a permit for "take" for the SMHM; however, this discussion is inconsistent with the requirements of the Fish and Game Code Section 4700. Permits for take are limited to necessary scientific research. Please revise this section to clarify that the Navy will implement measures acceptable to the USFWS to protect the SMHM, prior to the removal action.**

Response: Please see the response to EPA Specific Comment 6.

12. Comment: **Section 4.7.1.2 Compliance with ARARs/TBC Guidance, Page 39: Same comment as above.**

Response: Please see the response to EPA Specific Comment 6.

13. Comment: **Section 5.2 Implementability, Page 46: The EE/CA concludes that Alternative 2 is more difficult to implement than Alternative 3 because of the requirements for the soil disposal cell; however, the requirements for the soil disposal cell and its difficulty are not discussed under Alternative 2. For clarity and completeness, please revise the EE/CA to discuss the requirements for the soil disposal cell under Alternative 2.**

Response: The final EE/CA will be revised to include preliminary design considerations for a soil disposal cell.

14. Comment: **Table 4 Development of Risk Footprint: Two of the sample locations that were excluded from the risk footprint are identified on Figure 5 as "risk to birds indicated". SB102 is listed in Table 4 as below Tidal Area Ambient levels for all COCs. Please revise the EE/CA to clarify whether risk is indicated at these locations and, if so, include them in the risk footprint.**

Response: The risk footprint will be expanded to include the two sampling locations in the final EE/CA, as described in response to EPA Specific Comment 4.

15. Comment: **Table 5 Summary of Remedial Action Alternatives: This table does not include negotiations with the railroads for crossing the tracks under Preconstruction Activities. Since gaining permission to construct a**

crossing could take some time, please include this item under Preconstruction Activities.

Response: Table 5 will be revised in the final EE/CA to reflect a potential timeline for negotiations with the railroads.

16. **Comment:** **Table 6, Removal Action Comparative Analysis, Page 1 of 1: The analysis of Alternatives 2 and 3 related to their respective reductions in toxicity, mobility, and volume through treatment does not make sense. Both Alternatives 2 and 3 consist of excavation and on-site or off-site disposal, respectively. The indication that Alternative 2 results in effective reduction of toxicity and mobility, while Alternative 3 does not is not valid. Please revise this table so that the analysis of these alternatives is technically defensible.**

Response: Table 6 will be revised accordingly in the final EE/CA

17. **Comment:** **Table 8 Cost Estimate Summary for Remedial Alternatives: This table lists $1,752,502 as the net present value (NPV) for Alternative 3, but Table 6 lists 1.6 million as the NPV. Please correct this discrepancy.**

Response: Table 8 will be corrected in the final EE/CA.

18. **Comment:** **Figure 6, Proposed Haul Road Taylor Boulevard Bridge Site Access Road: As an alternate haul road/site access route, please clarify if the Navy has assessed access to Site 30 from a paved road shown on the figure that is approximately 250-feet southeast of the site (from the figure, the alternate road would need to cross three sets of tracks, but may be a much shorter distance for establishing a temporary road).**

Response: Preliminary discussions with the Union Pacific Railroad revealed that high-speed trains cross the three tracks 250 feet southeast of the site, and Union Pacific would not grant the Navy a permit to cross these tracks. The haul road will not be paved because the work will be conducted in the summertime.

RESPONSES TO WATER BOARD COMMENTS

A. GENERAL COMMENTS

1. **Comment:** **The Navy needs to insure that the project meets Water Quality Objectives for chemical pollutants as defined in the 1995 San Francisco Bay Basin Plan. The Navy will have to meet freshwater objectives as the wetland waters are defined as an estuarine water body.**

Response: The final EE/CA will include a focused discussion on dewatering as one of the principal pre-construction activities. An aqua barrier will be installed around the site (Figure 6, final EE/CA), and the site will be dewatered before any debris is removed. With the engineering controls in place and a stipulation that the

removal action will take place only during the summer, the Navy understands that the removal action will be relatively dry. Any water generated as a part of the removal action, either as a function of the confirmation sampling process or the potential need to dry excavated waste, will be containerized, analyzed, and disposed of appropriately at a licensed facility, if necessary.

2. **Comment:** **The project will require permit application as it might discharge sediment laden decant waters into waters of the United States. Hence, Water board staff recommends that the Navy consults the appropriate federal agencies to apply for NEPA and a 404 permit. Finally, if it is determined that a State issued 401 water quality certification is required for the proposed remedial activities, the Navy will need to follow CEQA guidance.**

Response: The National Environmental Policy Act (NEPA) does not apply to actions taken in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Like NEPA, CERCLA and the NCP establish a decision-making process for cleanup of past contamination that involves public notice and participation. The U.S. Department of Justice has expressed the opinion that these provisions of CERCLA, enacted into law after NEPA, are the functional equivalent of the NEPA process. Accordingly, compliance with the requirements of CERCLA satisfies NEPA's twin objectives of informed decision-making and public participation."

The California Environmental Quality Act (CEQA) is applicable to state discretionary decision-making, but not to actions of the federal government. U.S. EPA and the Department of the Navy have determined that the requirements of the CEQA are no more stringent than the requirements for environmental review under CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA). Pursuant to the provisions of CERCLA, the NCP, and other federal environmental impact evaluation requirements, selecting a remedial action with feasible mitigation measures and provision for public review is designed to assure that the proposed action provides for short- and long-term protection of the environment and public health. Hence, CERCLA performs the same function as, and is functionally equivalent to, the states requirements under CEQA.

3. **Comment:** **The report fails to address the treatment of on site groundwater and surface water generated by the leaching of contaminants and proposed remedial actions. Please address this data gap in the final report.**

Response: After construction of the temporary dewatering berm, the enclosed body of water will be pumped outside of the berm. No site work will be conducted during this time. After that area is dewatered, it will be the Navy's goal to avoid further dewatering during the construction effort. The waste will be excavated in a wet or moist condition and then will be hauled to an area where the waste

will be dried by spreading the materials to dry in the sun and wind. The final EE/CA will be revised to indicate that minimal water will be stored on site during the excavation effort. Any water collected after the site is disturbed during construction will be stored on site, analyzed, and disposed of at a licensed facility, if necessary.

4. **Comment:** **Water board staff recommends including a post remedial action monitoring plan in the report to include groundwater and ecosystem health monitoring.**

   Response: The RI and RI addendum indicate that there are no impacts to groundwater as a result of buried debris at the site, except where debris is in contact with groundwater. Since Alternative 4 (excavation and off-site disposal) is the preferred alternative, and this alternative removes the potential source of groundwater contamination, the risk of groundwater contamination at the site will be mitigated. As such, development and implementation of a groundwater monitoring plan is an unnecessary expense for the site.

5. **Comment:** **A summary of the cost analysis should be made in the report.**

   Response: The final EE/CA will include a cost summary in the body of the report.

6. **Comment:** **The Navy could use SADA (Spatial Analysis and Decision Assistance: http://www.tiem.utk.edu/~sada/) software to better delineate the probabilistically based extent of contamination in soils and groundwater at the site.**

   Response: SADA was not used to delineate the probabilistically based extent of contamination in soils and groundwater at Site 30; however, the Navy will keep it in mind for future use at other sites.

B. SPECIFIC COMMENTS

1. **Comment:** **<u>Executive Summary, p ES-1</u>:**

   - **The Navy needs to clarify the statement made: "The current level of inorganic chemical contamination at the site poses probable risk to plant, invertebrate, and bird and mammal receptors." Outline exactly what the Navy interprets as "probable." Has the Navy conducted a risk assessment for the site? If so what where the results?**
   - **Explain how the 268 mg/ kg lead concentration in soils was determined as the risk threshold for the site's ecological receptors.**
   - **Clarify how the Navy is planning to use Landfill Site 1 found on their property as an appropriate disposal site for wastes excavated at Site 30. Waterboard does not recommend such practice.**

- **Outline the results of the site's groundwater impacts due to the leaching of contaminants from the buried wastes.**

Response: The statement about the current level of contamination by inorganic chemicals at the sites was based on the conclusions of the RI and RI addendum. Please refer to the RI and RI addendum for details.

The 268 mg/kg level of lead is the maximum concentration outside the risk footprint. The Site 1 landfill will not be used as a disposal site; text that references use of the Site 1 landfill for disposal will be deleted from the EE/CA. Impacts to groundwater are discussed in the RI and RI addendum for the site. A summary of the results is also provided in Table 1 of the EE/CA.

2. Comment: **Section 2.1.2, Site Background and Historic Operations, p 5: Provide the approximate volume of the disposed artificial fill at the site using the obtained borehole data.**

Response: The sediment and composition of the artificial fill, the relative thickness, and the distribution of each unit are described in Section 3.3.2 of the RI report (Tetra Tech 2002). As noted in Section 2.1.2, the dates of disposal and the source of the debris at the site are unknown. Appendix B of the EE/CA provides the total removal action costs for each alternative at the site and includes volumes to be removed.

3. Comment: **Section 2.1.4, Geology, p 7: Indicate site specific hydraulic conductivity and porosity.**

Response: As stated in the RI addendum (Tetra Tech 2004), the hydraulic conductivities in the shallow subsurface are estimated to be low based on the soils encountered in the monitoring well borings. However, if Alternative 3 is selected, the Navy will calculate site-specific hydraulic conductivity and porosity in the removal action design phase.

4. Comment: **Section 2.1.5, Hydrogeology, p 7:**

- **Provide the surface and groundwater beneficial uses per 1995 San Francisco Bay Basin Plan.**
- **State if the groundwater is potable per SWRCB Resolution 88-63.**
- **Provide an analysis of the influence of tidal fluxes to groundwater levels in monitoring wells. Furthermore, a map indicating salinity concentrations in soils/ sediments and water samples taken within the tidal influence zone should be provided.**
- **State what the groundwater velocity is at the site.**
- **Provide the groundwater flow direction at the site.**

Response: The Bay Basin Plan (California Regional Water Quality Control Board 1995) specifies that beneficial uses for groundwater in the general area where Site 30 is located are municipal and domestic water supply, industrial process supply, agricultural water supply, and freshwater replenishment to surface waters. Water Board Resolution 88-63 defines groundwater that meets the following conditions as nonpotable: (1) the concentration of total dissolved solids (TDS) exceeds 3,000 milligrams per liter (mg/L) (or an electrical conductivity of 5,000 microSiemens per centimeter [µS/cm]); or (2) the source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day (gpd). These data are provided on the monitoring well sampling sheets in the RI addendum (Tetra Tech 2004). Electrical conductivity of the samples was recorded on monitoring well sampling sheets (Tetra Tech 2004, Appendix D), which show that the electrical conductivity of well GW001 ranged from 4,598 to 4,996 µS/cm during sampling. The electrical conductivities in wells GW002 and GW003 were 5,800 and 10,700 µS/cm. Specific yields of the monitoring wells have not been measured because of the difficulty of conducting pumping tests in wells screened in Bay Mud. However, the drawdown recorded on the well sampling sheets allows for an estimation of a steady-state yield. Well GW001 reached a steady-state yield (where the pumping rate was equal to the recharge rate, as evidenced by constant water level) at a pumping rate of 0.364 liters per minute (L/min), or 138 gpd. The steady-state yields in wells GW002 and GW003 were 223 gpd and 99 gpd. Considering the high TDS concentrations (as evidenced by the high electrical conductivity) and the low yield of the aquifer (as evidenced by the low steady-state yields), groundwater in the Taylor Boulevard Bridge area is not considered potable.

A tidal influence study has not been conducted and is not planned for this site. A tidal influence study would be conducted only if a detailed evaluation of the potential rate of contaminant transport were required based on the detection of significant levels of contamination in the groundwater. Soil, sediment, and water samples were not analyzed for salinity. However, data on salinity for water samples are available in the form of conductivity data, which were collected during the well purging process. These data are provided on the monitoring well sampling sheets in the RI addendum (Tetra Tech 2004).

Seepage velocity, the average rate at which groundwater moves between two points, was calculated using the following equation (Fetter 1980):

$$\text{seepage velocity} = Ki / \eta_e$$

where:

K= hydraulic conductivity (centimeter per second [cm/sec])
i = hydraulic gradient (dimensionless)
η_e = effective porosity of the material (dimensionless)

Site-specific information on hydrogeologic characteristics is not available for the Taylor Boulevard wells. Assuming a typical hydraulic conductivity value for silty clay of 10^{-6} cm/sec (Fetter 1980), measured hydraulic gradients of 1.03×10^{-3}

(November 2003) and 5.6 x 10^{-3} (February 2004), and effective porosity of 0.06 (approximated from specific yield values of 0.08 for silt and 0.03 for clay [Todd 1980]), estimated groundwater flow velocities may range from about 0.5 cm/year to 3 cm/year.

As shown in Figure 7 in the RI addendum (Tetra Tech 2004), directions of groundwater flow are variable. Based on two water level surveys, groundwater flowed to the south in November 2003 and to the west-southwest in February 2004.

5. Comment: **Section 2.3.2, Extent of Site Sediment and Groundwater Contamination, p 11:**

- **Specify the groundwater screening criteria used in the report.**
- **Report the groundwater contaminants concentrations detected at the site. Compare these values to ambient water quality criteria.**
- **The Navy needs to acknowledge that one of the sediment sample (site 4) collected by the Water Board Staff in December 2001 had elevated Arsenic concentration (120 ppm).**
- **Briefly indicate the groundwater monitoring wells characteristics (depth, screening interval, diameter and yield).**
- **The Navy needs to provide an appendix describing the soil boring lithologies for the monitoring well points installed in this project.**

Response: The information requested is provided in the RI and RI addendum (Tetra Tech 2002, 2004).

6. Comment: **Section 2.3.3, Contamination Fate and Transport, p 12:**

- **This section should be refined with a graphically based site conceptual model, outlining the various possible migration pathways of contaminants laden leachate. Please explain if contaminated groundwater could migrate into open wetland waters.**
- **Provide the matrix for "contaminant concentrations beneath the debris."**

Response: The final EE/CA will be revised to include a figure (Figure 5) outlining the site conceptual model. Please see the response to Water Board General Comment 4. The sentence referenced in the comment will be revised to read, "concentrations in sediment beneath debris."

7. Comment: **Section 3.4.2.1, Chemical-Specific ARARs, p 18:**

- **The Navy needs to provide the land use scenario, the depth of soil, the potability characteristics of groundwater and the surface water input to appropriately screen contaminants at the site.**
- **In the event the Navy is planning to screen using an industrial/ commercial land use scenario, the Navy needs to memorialize a covenant to prevent any future residential development until a risk assessment is conducted.**
- **Waterboard staff recommends the use of ESLs (Environmental Screening Levels http://www.waterboards.ca.gov/rwqcb2/esl.htm) to appropriately screen for remedial purposes at the site.**

Response: NWS SBD Concord is an active base, and no future changes to the current land use scenario are anticipated at this time. Groundwater at the site is not considered potable (see response to Water Board General Comment 4).

The groundwater data were screened using the most conservative of the marine or freshwater chronic values from the California Toxics Rule (EPA 2000) and the EPA National Recommended Water Quality Criteria (EPA 2002a). The Bay Basin Plan water quality objectives for waters upstream of San Pablo Bay were used for mercury (RWQCB 1995). The Navy will continue to use these values for future monitoring, and does not plan to use the ESLs.

8. Comment: **Figure 5, Estimated Risk to Assessment Endpoint Receptors Taylor Boulevard Bridge Disposal Site: Lead isoconcentrations contours with site-specific risk footprint of 268 mg/kg and the Cal-Mod lead soil PRG of 150 mg/kg should be drawn on an updated map.**

Response: The risk footprint was developed during the RI, which was conducted from 1996 through 2000. The 1999 PRG for lead was used to develop the risk footprint. Table 4 and Figure 8 clearly demonstrate that removing the lead-contaminated debris will mitigate risk to potential receptors at the site.

9. Comment: **Table 5, Summary of Remedial Action Alternatives, p 2 of 2: The table of remedial action alternatives is incomplete and unclear. Please tabulate each remedial action independently and provide the proposed components.**

Response: Table 5 in the EE/CA will be revised to provide additional detail, as requested.

RESPONSES TO DFG-OSPR COMMENTS

GENERAL COMMENTS

1. Comment: **The EE/CA should be revised to address all potential ARAR requirements relative to the salt marsh harvest mouse (SMHM) and black rail. These animals are identified as fully protected species under Fish and Game Code Sections 4700 (mammals) and 3511 (birds), in addition to their status under state and federal endangered species laws. The DFG cannot authorize the "take" of fully protected species. "Take" is defined in the California Fish and Game Code as "hunt, pursue, catch, capture, or kill", or attempt to "hunt, pursue, catch, capture, or kill." Since disturbance or direct impacts to SMHM or black rail may occur as a result of work conducted under the preferred alternative, "take" must be avoided. The DFG-OSPR can discuss options for take avoidance with the Navy. Methods to avoid take of either species may include, but not be limited to 1) avoiding construction during the black rail breeding season, 2) hand clearing of pickleweed or other wetland plants prior to any construction activity, 3) construction and placement of hay bales or other noise barriers, and/or 4) exclusion of SMHM and/or black rails by the placement of temporary barriers or other methods. Trapping and relocation of either the SMHM or black rails would involve "take", and therefore these methods are not allowable alternatives. Also, the U.S. Fish and Wildlife Service should be consulted on any potential impacts to the federally endangered SMHM.**

Response: As explained in the response to EPA Specific Comment 6, the Navy will survey for the presence or absence of SMHM to evaluate whether coordination with USFWS is necessary. If SMHM are present on the site, the Navy will coordinate with USFWS for concurrence on the plan for the removal that is protective of the SMHM. If the SMHM is found at the site, an independent biological monitor will be present at all times to monitor the removal action to ensure that the SMHM is protected. The draft EE/CA currently factors in the cost of the biological monitor. The final EE/CA will clarify that the biological monitor would be an "independent" function of the removal action.

2. Comment: **Insufficient analysis has been completed and presented to justify the exclusion of the chemicals of ecological concern (COECs), other than lead, from removal action objective (RAO) development and from the analyte list for confirmation samples.**

Response: Elevated concentrations of chemicals other than lead are collocated with elevated concentrations of lead. Thus, removal of sediments with high concentrations of lead will remove elevated concentrations of other contaminants as well. Additionally, removal of the debris will remove the source of contamination. The RI (Tetra Tech 2002) and RI addendum (Tetra Tech 2004) data confirm this conclusion. A table summarizing the conclusion will be incorporated into the EE/CA.

3. Comment: **The risk footprint for birds and mammals was based on the exceedance of high toxicity reference value (TRV)-based hazard quotients (HQs) for SMHM and of the 95% upper confidence limit (UCL) of the site data for birds. When the 95% UCL values were used with the high TRV, the resulting HQs exceed one for black-necked stilts exposed to copper (2.2), lead (5.7), mercury (1.5), selenium (2.6), and zinc (1.9). Furthermore, the use of a high TRV, which represents a mid-range adverse effect, is insufficiently protective for species of concern. As a result of these elevated criteria, the resulting risk footprint does not include several locations with elevated metals concentrations that may have significant impact on birds and mammals. The DFG-OSPR does not concur with the use of these criteria for estimating risk and determining areas requiring remediation or with the risk footprint that resulted from their use. The current risk footprint should be revised to include the following sample locations: 309SB106, SS213, SS214, SB102, SB100, 309SB05, SB200, SB106, and SS204.**

Response: The RI includes a comprehensive risk evaluation based on a weight of evidence approach with multiple lines of evidence. Risk was not based solely on contaminant concentrations in sediment. The methodology for conducting the risk assessment was agreed on before and during development of the RI. The risk assessment methodology and RI were extensively reviewed by the regulatory agencies at the time, and the RI was approved based on the review. Locations where risk was not indicated based on the results of the RI (Tetra Tech 2002) will not be revisited.

As a result of ongoing agency review and refinement of the EE/CA, the following locations are now included in the proposed excavation footprint: SB102, SB100, 309SB05, and SS204. Therefore, all locations where some risk was indicated in the RI are within the area to be excavated. SB200 is not a sample location at Site 30.

SPECIFIC COMMENTS

1. Comment: **Pages ES-1 and ES-2. Polynuclear aromatic hydrocarbons (PAHs) are not included in the list of primary chemicals of concern (COCs), although a removal action objective (RAO) is listed for this chemical group. Conversely, arsenic, cadmium, copper, chromium, iron, mercury, selenium, and zinc are listed as COCs, but RAOs are not included for them. Please resolve these discrepancies.**

Response: The RAO will be based on lead only. The RAO for PAHs will be deleted in the final EE/CA. Please see the response to DFG-OSPR General Comment 2 about RAOs for arsenic, cadmium, copper, chromium, iron, mercury, selenium, and zinc.

2. Comment: **Page ES-3. DFG-OSPR concurs with the selection of Alternative 3 as the recommended alternative.**

Response: Comment noted.

3. Comment: **Page 3. Please include a more detailed description of the site and conceptual site model including location relative to nearby roads, railroad tracks, and adjacent marshes, potential transport of site contaminants into Seal Creek Marsh, and any potential tidal influence.**

Response: A figure that depicts the conceptual site model will be incorporated into the final EE/CA. A more detailed description of the site and the conceptual site model can be found in the RI (Tetra Tech 2002) and the RI addendum (Tetra Tech 2004).

4. Comment: **Page 3. Reference is made to the potential for development of Site 30, however slight. Maintaining the wildlife resources of the tidal areas of Concord is consistent with Section 6.4.7 of the 2002 Integrated Natural Resources Management Plan and Environmental Assessment for NWSSBD Concord.**

Response: The only reference made to any potential development of Site 30 was in qualifying the use of residential PRGs for the human health risk assessment. The EE/CA states that it is highly unlikely that the site would ever be developed for residential housing since the site consists of a marsh. However, the final EE/CA will include a reference to the Integrated Natural Resources Management Plan to further justify why the site is an unlikely location for residential housing development.

5. Comment: **Figure 7. Please overlay the sample locations on this figure so the risk footprint area can be compared to the sample location information presented on Figures 4 and 5.**

Response: An overlay of the excavation area and the risk footprint (Figures 5 and 8) will be included in the EE/CA.

6. **Comment:** **<u>Page 8</u>. Please revise the descriptions "shoreline" and "wetland and upland transitional habitat" to more accurately reflect the habitat type with regards to salinity (freshwater, brackish, or marine), elevation relative to tidal height (*e.g.* mean lower low water), and vegetation type (mudflat, low marsh, high marsh, or terrestrial). In addition, please separately describe wetland/marsh and upland/terrestrial habitats.**

Response: The habitat descriptions in the EE/CA are consistent with the descriptions presented in the RI (Tetra Tech 2002). Site 30 is subdivided into two habitats, both considered brackish. (The final EE/CA will be revised to clarify this point.) The first is an open-water aquatic habitat, and the second represents a wetland and upland transitional habitat. Three dominant vegetation types are present in the wetland and upland transitional habitat; however, a true upland plant community is not found at the site. Section 2.1.6.3 describes the vegetation types in the wetland and upland transitional habitats.

7. **Comment:** **<u>Pages 8 and 9</u>. Please include more detailed descriptions of wildlife associated with the different habitat types.**

Response: Wildlife associated with the various habitats will be described in the final EE/CA.

8. **Comment:** **<u>Page 8</u>. Please note that pickleweed is an important food source for bird and mammal species as well, including several special status species.**

Response: The text will be revised accordingly.

9. **Comment:** **<u>Page 9</u>. Black rails may be present in the marsh areas of Site 30. This state-threatened species often utilizes cattail clumps, which occur at the site (Page 8, Section 2.1.6.1).**

Response: Please see response to EPA Specific Comment 5.

10. **Comment:** **<u>Page 12</u>. Please describe the source of the groundwater and surface water screening criteria used for comparison, and include the chemical specific values on a table.**

Response: The information requested is provided in the RI and RI addendum (Tetra Tech 2002, 2004).

11. **Comment:** **<u>Page 12</u>. Soil contamination is described as not extending beyond 1 foot depth, but debris occurs to 4 foot depth. Please clarify the relationship between soil/sediment contamination, the depth to which debris is present, and the depth below ground surface (bgs).**

Response: Section 4.4 of the final EE/CA states that "Chemical concentrations above the human health cleanup goals (Table 3) occurred mainly from the ground surface to 0.5 feet bgs (Tetra Tech 2002). Soils and sediments in locations where deeper samples were collected (between 1.0 and 1.5 feet bgs) did not exhibit an unacceptable risk to human health." Section 2.3.1 of the final EE/CA will be revised to state, "The vertical extent of debris ranges from 4 feet bgs at the end of the peninsula to 1 foot bgs in the central portion of the site." All debris is to be removed during the removal action. All soil above the RAO criteria is to be removed as well.

12. **Comment:** **Page 12. Please relate the water level fluctuations with the size of the areas that receive tidal flushing over different tidal heights and time periods (*e.g.* areas at mean higher high water elevation versus mean lower low elevation).**

Response: The text will be revised to include a reference to Figure 3, which shows the areas that undergo tidal flushing over various tidal heights and periods. The hatched area on Figure 3 shows the approximate seasonal variation in water level.

13. **Comment:** **Page 13. Please clarify the following statements as they appear to be inconsistent: "lead-contaminated debris is the primary contaminant of concern and source of risk to potential human receptors. Therefore, the site remediation criteria are based primarily on ecological risk."**

Response: The two sentences referenced will be deleted in the final EE/CA.

14. **Comment:** **Page 15. Please revise the statement that "a BAF [bioaccumulation factor] greater than 1 indicates the potential for contaminant uptake." A BAF greater than 1 means that the chemical has accumulated in the tissue of the organism to a concentration higher than in the associated media. A plant or animal can uptake/consume contaminated media and be exposed to that chemical, but not accumulate it due to the relative rate of absorption, metabolism, and excretion.**

Response: The final EE/CA will be revised as requested.

15. **Comment:** **Page 15. Please include a flow-diagram that illustrates the means by which risk to benthic invertebrates was evaluated. The text description by itself is hard to follow.**

Response: A flow diagram that illustrated the methodology used to evaluate the risk to benthic invertebrates was provided in the draft final RI (Tetra Tech 2002).

16. **Comment:** **Page 15. Please include a description of how risk to birds and mammals was evaluated.**

Response: The method used to evaluate risk to birds and mammals will be described in the final EE/CA

17. Comment: **<u>Page 15</u>. If arsenic is a chemical of ecological concern (COEC) for any receptors, please note them.**

Response: The final EE/CA will be revised to include the information requested.

18. Comment: **<u>Page 17</u>. It would be helpful to include a table with the cleanup levels for all chemicals presented and to describe the selection process in the text.**

Response: Cleanup levels were established for lead only. Please see response to DFG-OSPR General Comment 2.

19. Comment: **<u>Page 19</u>. The DFG-OSPR provided the Navy with ARARs applicable to Site 30 and other tidal area sites at NWSSBD Concord on September 15, 2004. These ARARs included Fish and Game Code Section 4700, which addresses fully protected mammals.**

Response: The Navy identified Fish and Game Code Section 4700 as a location-specific applicable or relevant and appropriate requirement (ARAR) and will comply with its substantive requirements.

20. Comment: **<u>Page 24</u>. Please include RAOs for the other COECs including arsenic, cadmium, copper, mercury, selenium, and zinc. A map overlay showing the locations which exceed the RAOs for the COECs individually could be then used to justify a risk footprint that accounts for risk from all COECs.**

Response: Please see response to DFG-OSPR General Comment 2

21. Comment: **<u>Page 26</u>. The section on visual determination of debris extent is unclear. Please clarify how this will be accomplished, including whether soil sieving will be used to identify the "rust flakes and fragments," and to what size scale and/or relative amount debris will be removed. The smaller and more degraded material has the greatest potential for mobilization, chemical leaching, and transport, but is the least likely to be identified by visual examination. Please explain how this dichotomy will be addressed.**

Response: Confirmation samples collected from the bottom and sidewalls of the excavation will be visually screened for the presence of debris. If debris is present, the excavation will be enlarged until all confirmation samples submitted for laboratory analysis are free of all visual signs of debris. Visual screening is expected to readily and accurately identify the extent of debris.

22. Comment: **<u>Page 26</u>. As mentioned above (General Comment #1), trapping and relocation of the SMHM is not allowable given their status as fully protected mammals for which take is prohibited.**

Response: Please see the response to EPA General Comment 6.

23. Comment: **<u>Page 27</u>. The basic restoration elements, as presented, are acceptable; however, a separate restoration plan should be prepared and submitted to the DFG-OSPR for review. Review by the U.S. Fish and Wildlife Service may also be applicable.**

Response: The restoration plan will be included in the removal action plan.

24. Comment: **<u>Page 27</u>. Please analyze the confirmation samples for all COECs rather than lead only.**

Response: Please see the response to DFG-OSPR General Comment 2.

25. Comment: **<u>Page 28</u>. Please include the criteria for inorganic and organic chemical concentrations in the backfill material.**

Response: The criteria for concentrations of inorganic and organic chemicals in the backfill material will be provided as part of the removal action plan, which will be prepared after the action memorandum has been accepted.

26. Comment: **<u>Page 28</u>. Please include monitoring of the habitat restoration area as a component of Alternatives 2 and 3.**

Response: The final EE/CA will be revised to include monitoring the habitat restoration area as a component of Alternatives 3 and 4.

27. Comment: **<u>Page 31</u>. The description of the soil disposal cell does not include any type of lining along the bottom and sidewalls to prevent chemical leaching.**

Response: The final EE/CA will be revised to include preliminary design and construction details for the disposal cell.

28. Comment: **<u>Page 37</u>. Please include long-term monitoring for the soil disposal cell to ensure the cap integrity is maintained, and that chemicals are not leaching into groundwater.**

Response: The final EE/CA will be revised to incorporate groundwater monitoring for 3 years, with a 5-year review to evaluate whether groundwater monitoring is still required.

29. Comment: **<u>Figure 6</u>. Please make the following changes to the risk footprint to address elevated concentrations of metals (organic chemicals were not analyzed in these samples). In addition, further sampling may be necessary along the entire western edge, north of sample locations SS200, SS201, and 309SB106, south of SB104 and SB105, and SS214, and east of SS213 and SS214 to define extent of sediment contamination.**

309SB05	SS200
309SB106	SS204
SB102	SS209
SB106	SS213
SS214	

Response: Please see response to DFG-OSPR General Comment 3. Locations where risk was not indicated based on the results of the RI (Tetra Tech 2002) will not be included in the risk footprint.

30. Comment: **Table 3. The values on this table are inconsistent with the data presented in the Draft Remedial Investigation Addendum document for the following:**

a. The maximum concentration within the risk footprint

i. for zinc (listed as 5410 mg/kg, but the concentration at location SB201 was 11,000 mg/kg).

b. The maximum concentrations outside the risk footprint

i. for cadmium (listed as 1.6 mg/kg, but the concentration at location SS204 was 3.4 mg/kg).

ii. for copper (listed as 111 mg/kg, but the concentration was 199 mg/kg at location SS204).

iii. for mercury (listed as 0.26 mg/kg, but the concentration was 1.5 mg/kg at location SS204).

iv. for selenium (listed as 0.32 mg/kg, but the concentrations at locations SS204, SB102, SB200, 309SB05, SB100, SB106, and SS209 ranged from 1.3 to 7.6 mg/kg).

v. for zinc (listed as 596 mg/kg, but the concentration at location SS204 was 609 mg/kg).

Response: Table 3 will be revised accordingly. It should, however, be noted that locations SS204, SB102 and SB100 all fall within the revised excavation footprint (Figure 6, Final EE/CA). SB200 was not a sample location at Site 30.

31. Comment: **<u>Table 3</u>. Please include for comparison the back-calculated sediment values with HQ equal to 1 with the high TRV for black-necked stilt and with the low TRV for the SMHM.**

Response: The Navy does not propose to include back-calculated sediment values with HQs equal to 1 in the EE/CA because they were not calculated as part of the RI (Tetra Tech 2002).

32. **Comment:** **Table 4. Please include selenium data in this table as it was identified as a COEC.**

Response: Data for selenium will be included in Table 4 in the final EE/CA.

33. **Comment:** **Table 4. Location SS204 is identified as being included in the risk footprint on this table, but is outside the footprint on Figure 5. Please revise Figure 5 appropriately.**

Response: Location SS204 is outside the risk footprint but within the excavation area. Figure 5 will be revised appropriately.

34. **Comment:** **Table 5. Hand removal of vegetation, if required, could require a longer time than the week allotted.**

Response: Please see the response to EPA Specific Comment 6.

35. **Comment:** **Table 5. Monitoring over a longer period than 3 years may be required with on-site disposal to ensure cap integrity and no chemical migration.**

Response: Comment noted.

36. **Comment:** **Appendix A, Table A-2. Please provide the information used to determine that black rails are not present at the site, and to justify that the ARAR for fully protected bird species is not applicable.**

Response: Please see the response to EPA Specific Comment 6.

RESPONSES TO COMMENTS FROM MARY LOU WILLIAMS (RAB COMMUNITY CO-CHAIR)

1. **Comment:** **The landscaping plans appear to cover most everything at the Site. The seed content, fertilizer, hydroseeding etc. I just wonder where the replacement soil will come from, on or off site. I have seen other soil in very large trucks being hauled away...not at CNWS...with little or no dust controls and I would hope this issue is carefully monitored to protect the neighboring communities.**

Response: The details of restoration, such as the source of replacement soil, will be addressed in the removal action plan, which will follow the action memorandum. The project plans and specifications will include contractual requirements for the control of dust, both on site and off site. Soil trucked off site will be covered.

RESPONSES TO CRC COMMENTS

GENERAL COMMENTS

1. Comment: **It is CRC's the Navy has wasted limited government and community resources by releasing a document of such poor quality. CRC believes that the Navy should prepare and circulate a new EE/CA for public review that addresses the concerns below.**

Response: The Navy regrets that CRC has found the report to be of poor quality. The EE/CA will be revised in response to comments issued by the regulatory agencies, RAB, and CRC. The final EE/CA will be made available for public review when completed (according to the requirements at Title 40 Code of Regulations [CFR] Part 300.420(n)(4)(ii) and 40 CFR 300.820). The process of agency and public review of draft and draft final versions of documents is intended to produce final documents that comply with the laws and address stakeholder concerns to the extent possible.

2. Comment: **The EE/CA does not include, as required, a comparison of a "few relevant and viable removal alternatives."[1]**

Response: The final EE/CA compares four different removal alternatives. These are:

- Alternative 1: No action
- Alternative 2: Monitoring
- Alternative 3: Excavation, stabilization, on-site disposal, land use controls (LUCs), and habitat restoration
- Alternative 4: Excavation, off-site disposal, and habitat restoration.

3. Comment: **The EE/CA should have been prepared as a joint EE/CA-Remedial Action Plan (RAP) to meet state requirements for removal actions.[2]**

Response: The state requirement for an EE/CA to be prepared as a joint EE/CA-removal action plan (RAP) applies only to sites that are not listed on the National Priorities List (NPL). The Taylor Boulevard Bridge Site is listed on the NPL.

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[1] **U.S. EPA, 1993, "Conducting Non-Time-Critical Removal Actions Under CERCLA," Office of Emergency and Remedial Response, EPA/5409/F-94/009, December.**

[2] **Health and Safety Code Section 25356.1**

Appropriateness of Removal Action

4. Comment: **In citing which factors[3] demonstrate the appropriateness of a removal action at Site 30 the EE/CA did not correctly quote the regulation. The correct citation is:**

> **Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants. [40 CFR 300.415(b)(2)(i)] (Omitted portion shown in Underline)**

CRC believes the omitted portion of the cited regulation justifies the removal action. Animals and the food-chain are actually exposed to Site 30 and human exposure is largely prevented by institutional controls (guarded military installation). The EE/CA should be revised to accurately cite the regulation.

Response: The final EE/CA will be revised to appropriately cite the regulation.

5. Comment: **The following factor, not identified in the EE/CA, demonstrates the appropriateness of a removal action at Site 30:**

> **Actual or potential contamination of drinking water supplies or sensitive ecosystems. [40 CFR 300.415(b)(2)(i)]**

Site 30 should be identified as a sensitive ecosystem for purposes of this removal action. After all, the EE/CA states that permanently eliminating the 0.5 acres of pickleweed habitat at Site 30 would "…drastically reduce the amount of habitat available to the SMHM [salt marsh harvest mouse], a federally endangered species."[4]

Response: Section 4.0 of the final EE/CA will be revised to state the following: "This cap will raise the elevation of the area, thereby reducing the amount of habitat available to the SMHM. The ARARs currently discussed in the draft EE/CA are adequate to justify the removal action.

6. Comment: **The EE/CA also sites this factor as demonstrating the appropriateness of a removal action:**

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[3] **40 CFR 300.315(b)(2) The following factors shall be considered in determining the appropriateness of a removal action pursuant to this section: (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants; (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems; (iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release; (iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate; (v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released; (vi) Threat of fire or explosion; (vii) The availability of other appropriate federal or state response mechanisms to respond to the release; and (viii) Other situations or factors that may pose threats to public health or welfare of the United States or the environment**

[4] **EE/CA, page 25.**

> **High levels of hazardous substances or pollutants or contaminants in soil largely at or near the surface that may migrate. [(40 CFR 300.415(b)(2)(iv)]**

The EE/CA implies that human health may be adversely affected if the removal action is not conducted. Since the conditions at Site 30 have apparently existed for over 60 years, the Final EE/CA should provide further information on the migration pathways of concern.

Response: Detailed information on the migration pathways of concern is provided in the RI (Tetra Tech 2002) and RI addendum (2004).

Cleanup Goals

7. Comment: **The EE/CA refers to two different cleanup levels for lead, so it is not clear which cleanup goal confirmation samples will be compared with to determine if additional soil excavation is required.**

One lead cleanup level is the Region IX Preliminary Remediation Goal of 400 mg/kg for residential land-use. The EE/CA indicates that achieving this cleanup level would result in no land-use restrictions being placed on the site. California however has established a standard for lead in soil of 130 mg/kg for residential land-use. Unless the limits of the proposed excavation are extended to encompass soils containing lead above 130 mg/kg, future land-use restrictions would still be required.

In addition to the 400 mg/kg PRG, the EE/CA sites a lead cleanup value of 268 mg/kg. This is the highest detection of lead outside the limits of the proposed excavation.

Response: The final EE/CA will be revised to clearly state that the highest detection of lead outside the limits of the proposed excavation (268 mg/kg) will be used as the cleanup value for lead.

8. Comment: **The limited investigation of groundwater contamination at Site 30 shows significant arsenic contamination. Despite this the EE/CA indicates:**

> **This action is intended to serve as the final remedial action for residential human health and ecological risks associated with the known contamination within Site 30.[5]**

Groundwater contamination at Site 30 should be adequately investigated to determine if future remedial action is necessary.

Response: The RI addendum (2004) addresses potential contamination in groundwater. The highest concentration of arsenic (150 micrograms per liter [µg/L]) was detected in the sample from monitoring well GW01, which is upgradient of the debris field. The exact source of arsenic in monitoring well GW01 is unknown;

[5] **EE/CA, page 17**

however, it is likely related to the debris. The hydraulic gradient for the site is nearly flat which, along with the generally low hydraulic conductivities in the subsurface, suggests that the rate of groundwater flow across the site is very low.

9. Comment: A PAH concentration of 0.62 mg/kg benzo(a)pyrene equivalents is a removal action objective. The Sampling and Analysis Plan for the Removal Action should ensure that PAH soil analysis has low enough detection limits in order to evaluate the confirmation samples. EPA Method 8310 provides lower detection limits, than the method used during previous RI sampling.

Response: The RAO will be based on lead only. The RAO for PAHs will be deleted in the final EE/CA. Please see the response to DFG-OSPR General Comment 1.

10. Comment: The Sampling and Analysis Plan should describe monitoring activities that ensure that pickleweed vegetation is established at the restored site. The monitoring should include "triggers" so that actions will be taken if vegetation restoration is not fully successful.

Response: The purpose of the EE/CA is to analyze various removal alternatives and to select the preferred alternative. Detailed construction details on the preferred alternative, such as monitoring plans for restored vegetation, will be provided in follow-on removal action design documents.

On-Site Disposal Comments

11. Comment: The EE/CA's Requirements (ARARs) for on-site waste disposal states in it entirety:

> **"There are no ARARs for the on-site disposal other than the RCRA land disposal restrictions described in Section 4.2.1 and in the chemical specific discussion" (Appendix A, Section 4.2.3)**

The EE/CA fails to identify a number of waste disposal requirements including Corrective Action Management Units (CAMU) regulations that govern on-site disposal. Placing wastes in a CAMU is not considered land disposal. Therefore, RCRA land disposal restrictions would not be apply.

The placement of wastes in a CAMU is at the discretion of the state. regulations require treatment of RCRA wastes. Treatment must reduce the TCLP result by 90 percent or remove 90 percent of the total metal from the waste.[6]

Please correct the ARAR discussion in the EE/CA so the restrictions for on-site waste disposal are not ignored.

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[6] **Title 22 California Code of Regulations, 66264.552, Corrective Action Management Units (CAMU) for RCRA Hazardous Waste**

RCRA Waste Characterization

Excavated soil is considered a waste that requires characterization to determine restrictions on land disposal. For example, excavated soil would be prohibited from land disposal if it contains "free liquids."

Excavated soil would be characterized as a RCRA Hazardous waste, that must be treated prior to land disposal, if results from the Toxicity Characteristic Leaching Potential (TCLP) test contain greater than 5 mg/L leachable lead. Soil would be characterized as a non-RCRA (California only) Hazardous Waste if it contains total lead concentrations above 1,000 mg/kg and a TCLP test result less than 5 mg/L. California regulations also require that wastes containing greater than 350 ppm total lead to be placed in a hazardous waste landfill.[7]

RCRA waste characterization guidance uses the 95 percent upper confidence limit (UCL) value to determine waste characteristics. For the soils to be excavated the 95 percent UCL for total lead in soil is 3,470 mg/kg.[8]

Response: The EE/CA will be revised to explain the ARARs for Alternative 2, which involves excavation, solidification and stabilization, and on-site disposal. The draft EE/CA stated that the only potential ARARs for Alternative 2 involved the RCRA land disposal restrictions (LDRs). The final EE/CA will be revised to more specifically explain this alternative. LDRs are potential ARARs if waste is to be disposed of on land. However, it is unlikely that LDRs, or any other hazardous waste disposal requirements, will be triggered under Alternative 2 because the solidification and stabilization process will render the waste nonhazardous. Therefore, the only likely potential ARARs are the requirements at California Code of Regulations Title 27 for disposing of solid waste, and the Navy intends to add the relevant sections as ARARs. The California Code of Regulations Title 27 engineered alternative cover for covering the solidified and stabilized material and the Title 27 post-closure groundwater monitoring requirements will be added as potential ARARs. The Navy believes that, although the requirements in CCR Title 27 will be added to the EE/CA, EPA does not always consider it necessary to cover soil that has undergone the solidification and stabilization process. EPA records of decision have selected remedies that use soil that has been treated with this process as backfill without the need for any cover. (See for example Macalloy Corp., EPA./ROD/R04-02/084) August 21, 2002.)

The comment states that the EE/CA fails to discuss the CAMU regulations. A CAMU is required only if waste is managed outside the area of contamination (AOC). Under Alternative 2, the soil will be treated within the AOC; therefore, the CAMU regulations are not triggered. Movement of hazardous waste within

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[7] California Health and Safety Code "25157.8 (a) Except as provided in subdivision (c), on and after January 1, 1999, no person shall dispose waste that contains total lead in excess of 350 parts per million, copper in excess of 2500 parts per million, or nickel in excess of 2000 part per million, *to land at other than a class I hazardous waste disposal facility…"* (*emphasis ours*). This ARAR was not identified in the EE/CA.

[8] EE/CA, page 14; 95 percent UCL for samples collected in Area A, the center of the site were lead concentrations in soil exceeded 400 mg/kg.

the AOC is not a new act of treatment, storage, or disposal under the AOC policy.

The last part of this comment relates to RCRA waste characterization. As explained above, the excavated material will be treated within the AOC; therefore, the RCRA land disposal requirements do not apply to movement of the material within the AOC. As far as the ultimate location of the stabilized material, the RCRA land disposal restrictions and other RCRA disposal requirements will not likely be triggered because the material will be nonhazardous. The Navy will determine whether any material that is excavated and not treated would be characterized as RCRA hazardous waste pursuant to the requirements identified as ARARs at Title 22 California Code of Regulations.

12. Comment: The soil to be excavated has not been characterized because according to the EE/CA:

> **"The current analytical results are not adequate to identify the disposal facility or the land disposal treatment requirements." (EE/CA, p. 38)**

It was an unacceptable oversight that the recently completed Site 30 Remedial Investigation did not collect samples to determine land disposal restrictions on excavated waste. According to EPA's [9], the need for this data should have been RI/FS identified during the scoping phase:

> **"The identification of potential technologies at this stage will help ensure that data needed to evaluate them (e.g., BTU value of waste to evaluate thermal destruction capabilities) can be collected as early as possible."**

The lack of TCLP data makes it impossible to evaluate land disposal alternatives for soil excavated from Site 30. This data inadequacy should be addressed at sites throughout CNWS were remedial alternatives may potentially include excavation and disposal.

Response: The Navy does not agree that lack TCLP data is an unacceptable oversight. The soil will be characterized for disposal as part of the removal action.

13. Comment: Though the need to determine the waste classification is noted in both Alternatives No. 2 and Alternative No. 3 the detailed cost estimate includes no such costs for Alternative No 2, and only a single waste classification sample for Alternative No. 3. Similarly, Alternative No. 2 does not include any sample costs for determining if waste stabilization meets the treatment objectives.

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[9] **1988, US EPA, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final," Office of Emergency and Remedial Response, October.**

Response: The final EE/CA will include costs for characterizing the stabilized, excavated material. Alternative 3 becomes Alternative 4 in the final EE/CA, as Alternative 1 is broken down into two separate components. The final EE/CA will include sufficient characterization tests to identify the most appropriate landfill to receive the excavated material.

Alternative No. 2 – Stabilization, On-Site Disposal

14. Comment: **It is CRC's comparison of viable alternatives was made during the EE/CA. Alternative No. 2 proposes digging a pit near Site 30 to the depth of groundwater and using the pit to dispose of stabilized soil and debris from the removal action. According to the EE/CA:**

> **"On-site disposal will be designed such that no new exposure pathways to disposed material are created."**

Among the most important design criteria for landfills is location. A pit dug near Site 30 is an inappropriate location for a number of reasons, including a separation of 50 feet does not exist between the bottom of the landfilled wastes and groundwater.

Response: The Navy understands that the 50-foot separation applies only to CAMUs; hence, this requirement does not apply since the soil disposal cell is being constructed within the AOC. The final EE/CA discusses the conceptual construction details for the soil disposal cell. Please see the response to CRC General Comment 10 for more information on AOCs.

15. Comment: **The EE/CA incorrectly states that:**

> **"Once stabilized the waste should no longer be hazardous."**

The stabilized wastes will still require management as RCRA wastes and the proposed on-site disposal cell will be subject to CAMU regulations requiring a composite liner and a leachate control system.

Response: Please see response to CRC Comment 11.

16. Comment: **The cost details indicate 5,262 cubic yards of soil will be required to backfill Site 30 after the excavation of 2,500 to 4,400 cubic yards of contaminated soil and debris. These soil volumes contradict the Conceptual Grading Plan (Figure 8) and Site Reconstruction Limits (Figure 9), that indicate that more soil is to be excavated from Site 30, then will be used as back-fill.**

Response: The backfill amount represents the assumption of a 30 percent shrinkage factor when soil is returned into the ground.

17. Comment: **No costs or equipment are proposed to screen soils to remove debris prior to the stabilization step. Is it the intention to place a railroad tie in a mixer with concrete?**

Response: The final EE/CA will include costs to screen the excavated material before it undergoes the stabilization process.

18. Comment: **CNWS is an RCRA-permitted facility and therefore temporary units for treatment of corrective action wastes, and stockpiling of corrective action wastes are subject to RCRA requirements. No costs or equipment are proposed to comply with RCRA facility requirements.**

Response: Please see the response to CRC General Comment 11

Alternative No. 3 – Stabilization, Off-Site Disposal

19. Comment: **Similar to Alternative No. 2, the analysis of Alternative No. 3 proposed too much backfill, and lacked costs and equipment to comply with RCRA Facility requirements.**

Response: Please see the responses to CRC General Comments 11 and 16.

20. Comment: **No costs or equipment are proposed to screen out debris or to de-water wastes prior to transportation off-site. The EE/CA has proposed using the Tidal Area Landfill to dispose of soil excavated from Site 30 citing a savings of $652,000 in the cost of off-site disposal. This cost represents transportation, stabilization and disposal costs. Since stabilization is likely to be required the cost savings should be reduced by $480,000, which is Alternative No. 2's estimated.**

Response: Please see the response to CRC General Comment 17 on waste screening. The final EE/CA will be revised to discuss the dewatering procedure for Alternatives 3 and 4. The Site 1 landfill will not be used as a disposal site; text referencing the use of the Site 1 landfill for disposal will be deleted from the final EE/CA

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